

3 0455 0003 8969 2



BLM - ALASKA RESOURCES LIBRARY
01628.44136
Land - fisheries study, 1967, southwest

**BUREAU
OF
LAND MANAGEMENT**

Lands - Fisheries Study 1967

Southwestern Brooks Range Lakes

BLM - Alaska Department of Fish and Game

**UNITED STATES
DEPARTMENT OF THE INTERIOR**

QL
628
.AY
L36
1967

Lands - Fisheries Study 1967

Southwestern Brooks Range Lakes

BLM - Alaska Department of Fish and Game



ALASKA RESOURCES LIBRARY

U.S. Department of the Interior

ARLIS

Alaska Resources Library & Information Services
Library Building, Suite 111
3211 Providence Drive
Anchorage, AK 99508-4614

Brooks Range Lakes Study - 1967

This study was conducted in cooperation with the Alaska Department of Fish & Game on the major lakes in the Walker Lake complex on the southwest side of the Brooks Range.

The purpose of the study was to gather basic fisheries and lands information so that classification proposals and a comprehensive management plan can be drawn up for the major lakes in the area. Previous work, as a part of the recreation inventory, was made by Wayne Boden in the summer of 1964; however, no scientific fisheries inventory or study had even been attempted on the lakes nor has a comprehensive land use plan or inventory been completed.

The study, as proposed and carried out, was designed to get general information on the fish populations and the physical properties of the shore lines of the lakes. A sample of the fish population was taken in each lake by setting a gill net in each for a period of 24 hours. Each fish was weighed, measured, and sexed, and scale samples and parasite samples were taken. These samples should give an indication of the time required to produce a sport fish, especially trophy fish and, in turn, help to decide the type of development that a lake shore should be classified for. Spot depths of the lakes were also taken with a fathometer.

Headquarters for the study was Walker Lake and transportation was provided by an ADF & G 180 Cessna on floats. Originally, a BLM Goose was scheduled for the trip; however, fires prevented

this, so the 180 was substituted. Excellent cooperation was received from the pilot; however, the necessity of multiple trips in order to move men and gear, made the cost as expensive as a Goose. A total of 20 hours and 17 minutes of flight time was recorded at a cost of \$811.34.

Actual netting of the lakes began on Thursday, July 27, and was completed on August 2. The following lakes were netted, and the shore lines given a brief review and rough typing of vegetation and shore line characteristics:

Helpmejack, Iniakuk, Kollioksak, Minakakosa, Nutuvukti, Selby-Narvak, Takahula, Tobuk, Walker and Wild Lake*.

The scale samples taken will be read this winter which will give the ages of the fish and some indication of the productivity of the lake.

Following is a list by lake of the netting results:

<u>LAKE</u>	<u>SPECIES</u>	<u>SEX</u>	<u>LENGTH</u> (inch)	<u>WEIGHT</u> (pound) (ounce)	
Helpmejack Lake	Northern Pike	M	16.0	1	-
		M	20.5	2	5
		F	19.5	2	4
		F	19.75	1	13
		M	18.75	1	12
		F	21.5	3	-
		M	27.5	6	6
		F	14.0	-	12
		M	19.5	2	6
		F	26.5	6	4
		F	25.5	6	2
		M	24.0	4	12
	Grayling	F	5.5	-	-
	Whitefish	F	11.25	-	-

LAKE	SPECIES	SEX	LENGTH (inch)	WEIGHT	
				(pound)	(ounce)
Iniakuk Lake	Northern Pike	M	30.11	7	8
		M	20.5	2	2
		M	24.0	3	6
		F	20.5	2	3
	Whitefish	F	9.25	-	-
		F	13.0	-	-
		M	9.64	-	-
		M	10.70	-	-
		F	23.14	6	13
		M	17.79	3	3
		M	18.03	2	12
		M	18.14	2	11
		M	22.63	4	6
	Northern Pike	F	27.6	6	3
		F	24.17	3	10
		F	16.77	1	-
		F	15.66	1	-
		M	16.14	1	-
		M	14.76	1	13
Kollioksak Lake	Cisco	F	13.50	1	3
		F	10.31	-	-
	Lake Trout	M	23.5	4	4
		F	26.0	6	4
		M	17.0	2	-
		F	17.0	1	6
		M	12.0	-	-
		M	13.5	-	-
		M	14.5	-	-
		M	20.0	2	10
	Northern Pike	?	25.0	-	-
		F	31.0	8	8
		F	23.5	2	12
		M	21.5	4	12
		M	18.5	2	12
		M	20.0	3	12
Nutuvukti Lake	Whitefish	F	19.0	1	5
		M	20.5	3	6
		?	19.5	-	-

<u>LAKE</u>	<u>SPECIES</u>	<u>SEX</u>	<u>LENGTH</u> (inch)	<u>WEIGHT</u>	
				(pound)	(ounce)
Selby-Narvak Lake	Lake Trout	F	27.0	6	5
		M	21.25	3	9
		F	20.86	3	0
	Northern Pike	F	38.5	16	12
		F	38.0	13	0
		F	27.0	5	5
		F	30.5	6	11
		F	30.5	7	10
		M	19.99	2	5
		M	15.70	1	1
	Grayling	F	5.82	-	-
		M	15.94	1	8
		F	14.96	-	-
		F	15.74	1	8
		F	10.23	-	-
		F	11.06	-	-
		F	16.33	1	8
Takahula Lake	Northern Pike	M	28.14	6	-
		F	30.98	7	2
		F	11.02	-	-
Tobuk Lake	Northern Pike	M	28	4	6
		F	23	2	6
		M	22.5	2	10
		M	21.5	2	-
		F	21.5	2	6
		F	24.5	3	14
		F	21.75	2	2
		M	28.0	4	2
		M	21.0	1	14
		M	28.5	3	12
		F	31.5	8	8
		M	24	3	8
		F	27	4	12
		M	19.5	1	10
Walker Lake	Lake Trout	?	30.0	14	-
		M	20.75	3	13
		M	19.5	3	1
		F	26.0	6	13
		F	19.0	2	7

<u>LAKE</u>	<u>SPECIES</u>	<u>SEX</u>	<u>LENGTH</u> (Inch)	<u>WEIGHT</u> (pound) (ounce)	
Walker Lake (cont.)	Lake Trout	F	21.0	3	4
		F	26.25	3	1
		M	20.75	3	11
		M	15.5	1	4
		F	6.5	-	-
		F	33	19	5
		F	14.1	-	14
		F	19.5	2	6
		F	17.75	2	-
	Char	M	22.0	3	11
		M	24.5	6	-
	Grayling	M	14.0	-	-
		?	4.5	-	-
	Whitefish	F	13.75	5	5
		F	13.25	-	-
		F	14.75	-	-
		F	13.75	-	-
		F	13.5	-	-
		M	13.25	-	-
		M	13.5	-	-
		F	13.0	-	-
		F	10.75	-	-
		?	5.5	-	-
		F	13.5	-	-
		F	13.5	-	-
		M	13.25	-	-
		M	15.5	-	-
		F	14.5	-	-
		F	13.0	-	-
		F	13.0	-	-
		F	15.5	-	-
		F	13.75	-	-
		F	13.4	-	-
		F	13.25	-	-
		F	14.75	-	-
Wild Lake	Lake Trout	F	27	8	-
		F	21	3	8
		M	17.2	1	2
		F	16.5	1	8
	Northern Pike	F	24.25	3	2
		M	22.5	2	4

<u>LAKE</u>	<u>SPECIES</u>	<u>SEX</u>	<u>LENGTH</u> (inch)	<u>WEIGHT</u> (pound) (ounce)	
Wild Lake (cont.)	Whitefish	F	15.5	1	2
		M	12	-	-
		F	10.25	-	-
		F	12	-	-
	Cisco	F	9.25	-	-

Kollioksak Lake

This lake is located in a scenic area; however, its shore line is poor, consisting of flooded willow and swampy conditions. Whether this is a normal situation or the result of high lake water level, is not known. The best portion, in its natural state, is the southern end. The shore line might be made suitable by cutting the shore line vegetation, as the lake bottom appears to be solid and rocky for the most part.

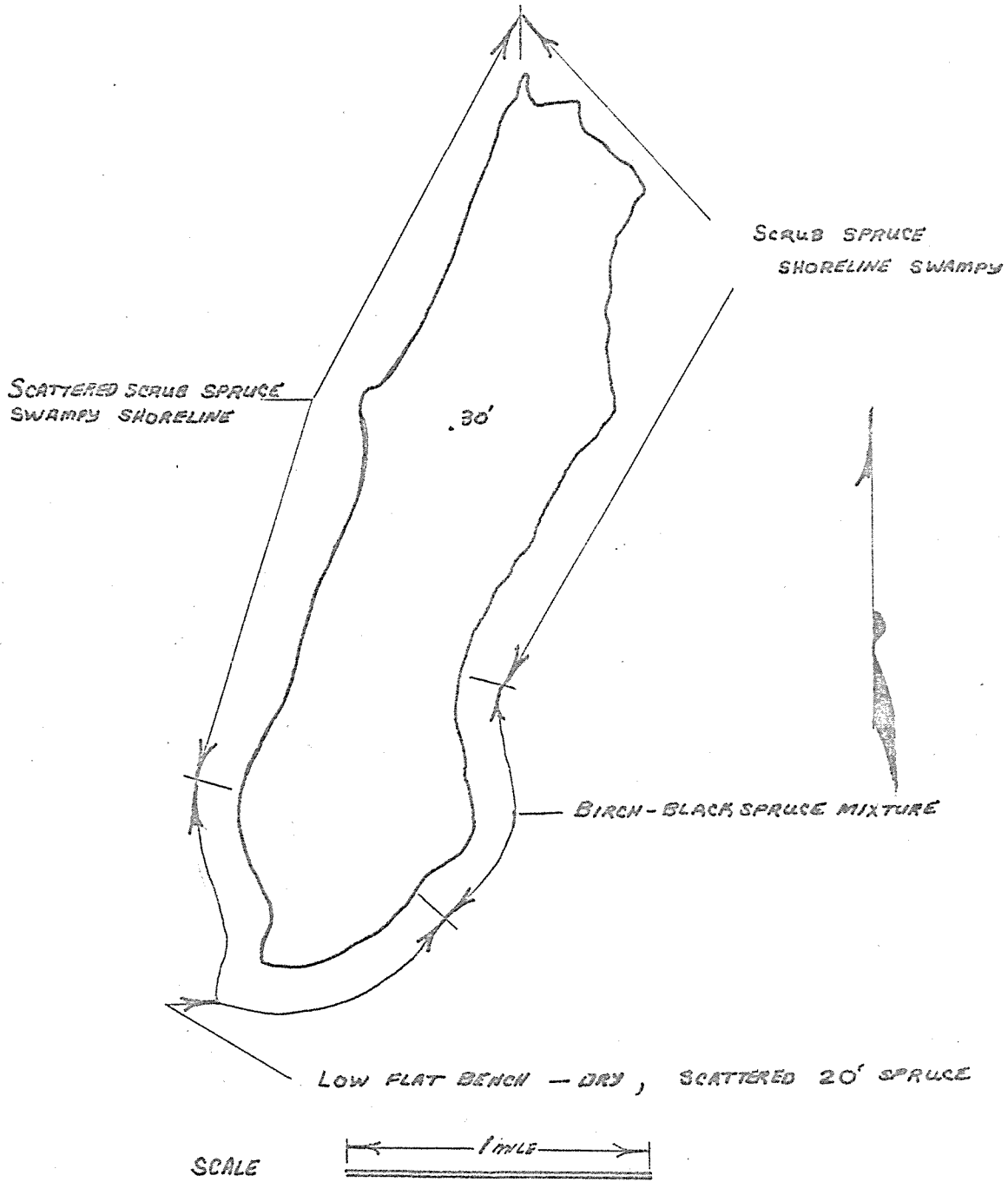
It, like most arctic lakes, would suffer from overdevelopment; however, the test netting only produced small northern pike and cisco. This should not be interpreted as conclusive of the fishing values (see Fish & Game report).

This lake is not rated as high as some of the other Brooks Range lakes from the scenic, fishery, or shore line development potential, and is not, therefore, in as much danger of adverse land filings and development in the immediate future.

In Boden's report of October 21, 1964, it was recommended that an area of 60 chains by 20 chains be withdrawn on the south end of the lake. The 607 classification is now more applicable and, in fact, the shores of the lake are included in the proposed Borneite classification.

Fig. 1

KOLLIOKSAK LAKE



SELBY-MARVAK LAKE

Selby-Narvak Lake

Selby Lake is the next to the largest lake of the group, as well as one of the most scenic. It does not, however, lend itself as well to development because of the relatively few areas along the shore line that are level enough. Most of the shore line is too steep and the north end of the lake is swampy along the shore line. A cabin has been built on the northeast shore in the best building spot on that shore line. On the northwest shore, there is only one area that would be suitable for development. This is a spruce-covered point near the north end of the lake. The center of the lake is the most important area for development or public use. At this point, a long, partially level, rocky point divides the lake into two parts leaving only a narrow passage. This point is covered with patches of spruce and birch, and has no swampy areas. This area is especially important because the best fishing is located at the narrows and, since the lake does not have many protective coves, the point provides quiet water when the wind blows north or south through the pass.

The south end of the lake is, for the most part, physically suitable for development, although there are some disadvantages. The land at this end is relatively level, but has little timber except for scattered patches of small birch and spruce. Also, there is little natural protection from the wind and wave action coming down the lake from the north.

Boden's report recommended withdrawal of (1) a one chain strip along the entire north end of Narvak Lake, (2) a parcel of land 60 chains long by 20 chains deep, to include the spruce grove on the

northeast side of Narvak, (3) a ten foot right-of-way at the narrows between Selby and Narvak on both banks, and (4) a withdrawal, 40 chains by 10 chains, to include the spruce stand on the middle of the east shore of Narvak.

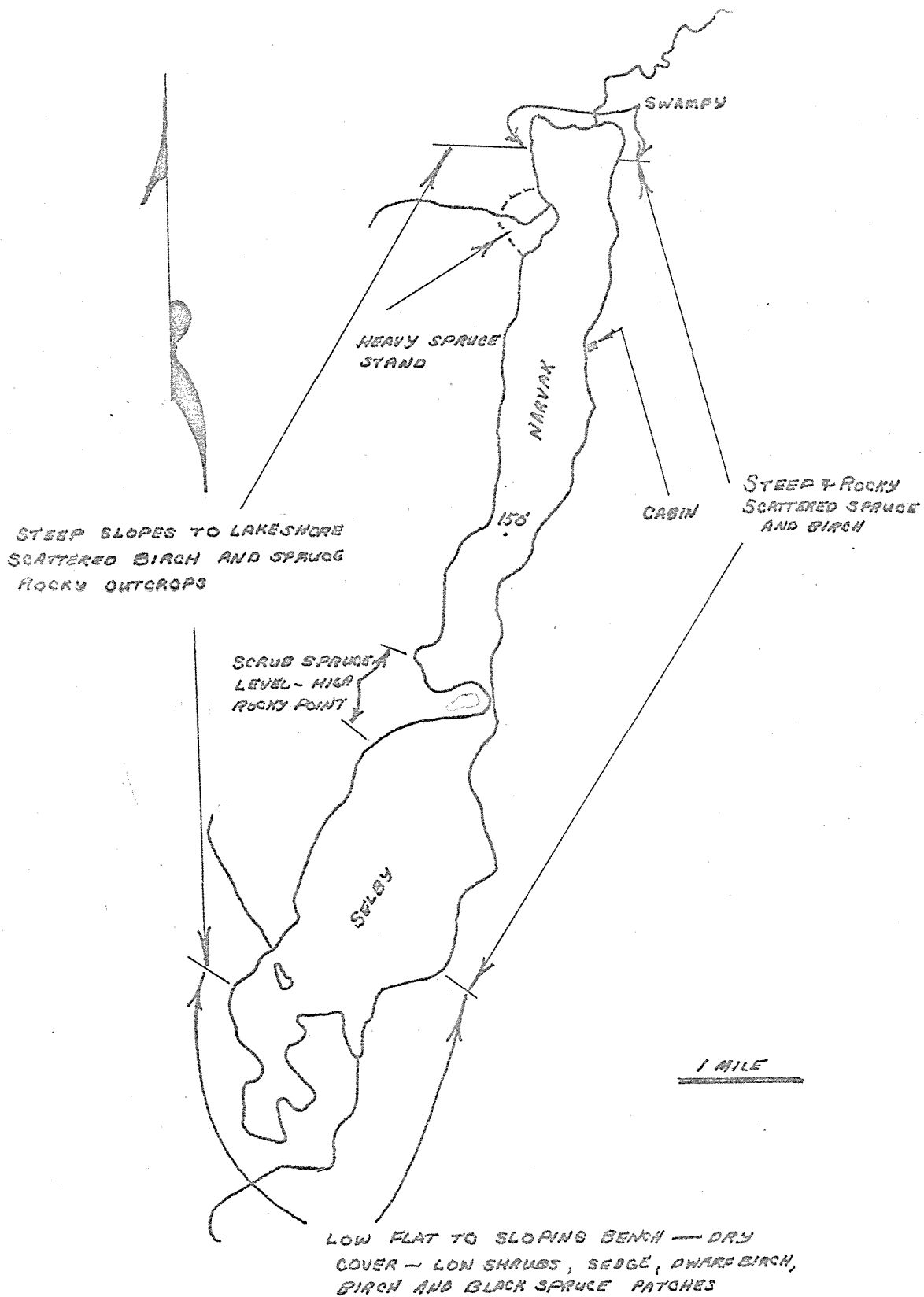
The new cabin that is located on the east shore of Narvak Lake is thought to be located on Parcel 4. No claim is of record; however, the cabin is believed to belong to a native and is, thus likely to have established rights that would be valid anytime he chose to file.

The new 607 classification procedure on a larger acreage around the lake is recommended as the correct management tool for this lake. A township and one half has been blocked out around the lake to form a unit containing all of the lake shore, the scenic vistas around the lake, and most of the tributary streams to the lake. (Fig. 3) This area is felt to be the optimum for management and should be classified against all forms of disposal under the land laws until the area can be examined in detail.

It is recommended that totally restrictive classification be placed on the shore line of the lake for a distance of one half mile from the shore line.

In the three years since Boden's report, we have witnessed the appropriation of one of the prime spots on the lake. Six filings on this lake could remove all of the best locations on the lake from public use. It is of utmost importance that classification, as recommended, procede this winter before further filings are made, and before authority for classification ceases in 1969.

Fig. 2



MINAKOKOSA

Minskokosa

This lake is one of the more scenic lakes of the lakes reviewed in the southwestern portion. The northeast portion of the lake appears to be too steep for building as does the central portion of the western shore. The lands are level or gently sloped at the inlet on the north end and on the south end, for a mile or more on each side of the outlet.

Vegetation around the lake consists of scattered tall spruce at the water's edge and scrub spruce and small birch trees along the slopes. On the south end of the lake, the spruce are scattered with open lichen patches covering the ground in between. A very good site, approximately 20' above the lake and covered by 20' to 30' spruce, is located on the west side of the outlet. Another good site covered with good spruce stands is located on both sides of the inlet on the north side of the lake.

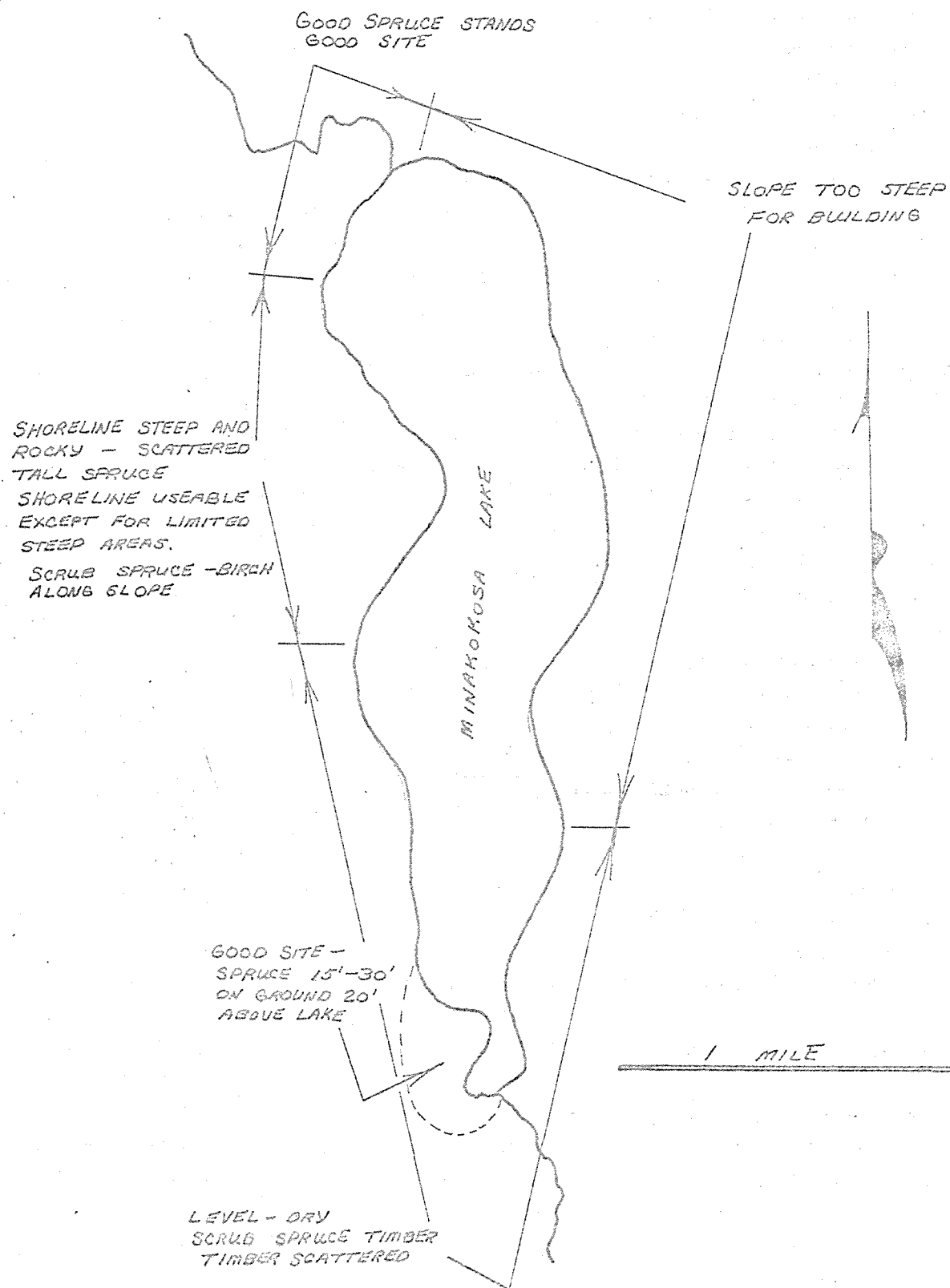
This lake should receive priority for complete protection, as it is the most scenic lake without any development. The inlet and outlet areas are actually the prime areas; however, in order to preserve the character of the lake, the entire shore line and the inlet stream should be placed under complete protection through 607 classification.

Boden's report of October 1964 recommended that 160 acres be reserved on the north end.

The maximum depth recorded in a spot depth reading of the lake was 135 feet. Test netting produced whitefish of over two pounds and lake trout of over six pounds.

It is felt that this lake is likely to be filed on before most of the others inventoried and, therefore, it is important that it be given priority of classification. At the present time, no filings have been made on this lake.

Fig. 3



CLASSIFICATION RECOMMENDATIONS

Partial Restriction



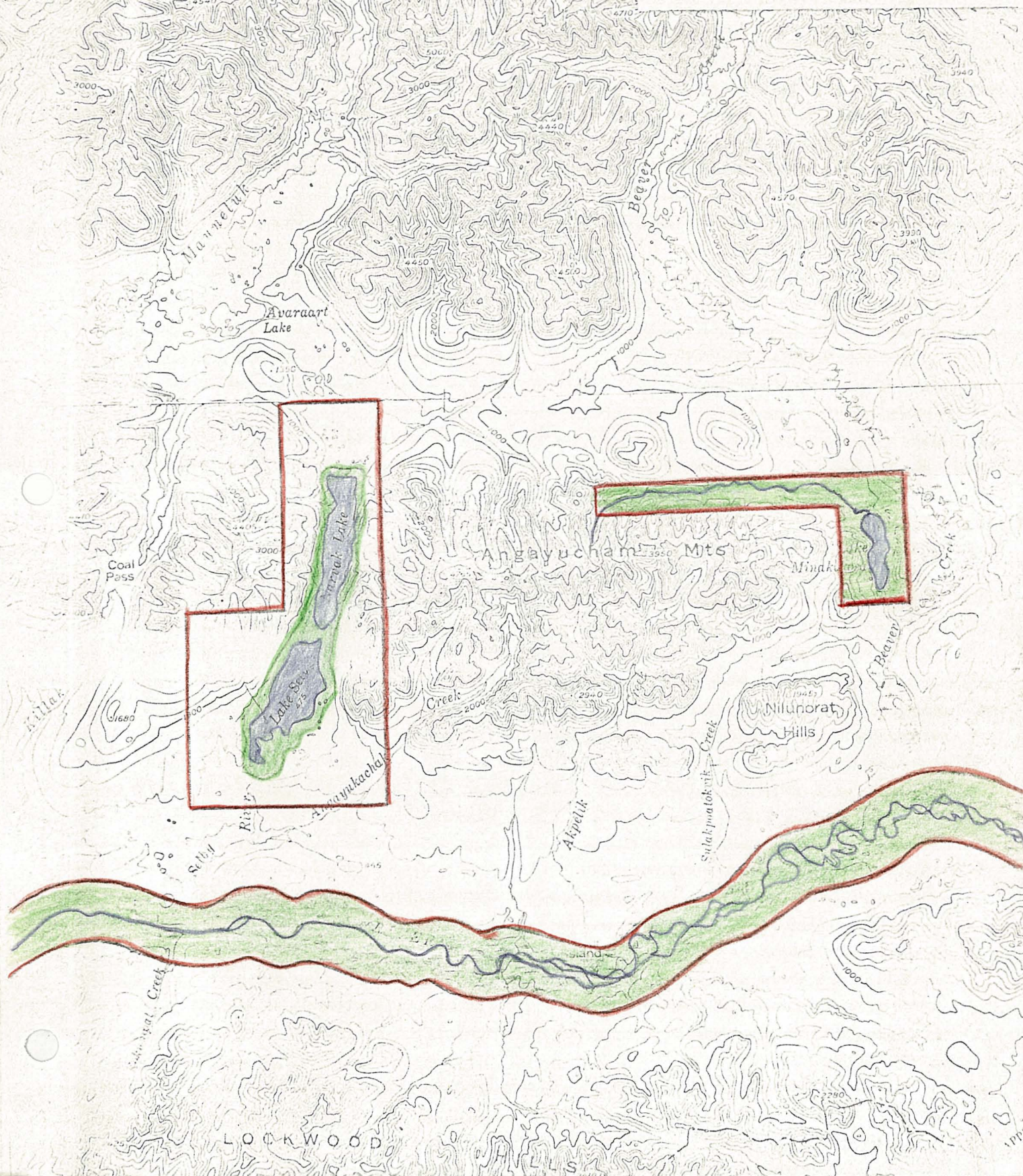
Alternative Partial
Restriction



Complete Restriction



Fig. 4



NUTUVUKTI LAKE

Nutuvukti Lake

This lake is evaluated as being about the same as Kollioksek. The area is not quite as scenic as the lakes located deeper in the mountains, and the shore line is, for the most part, swampy.

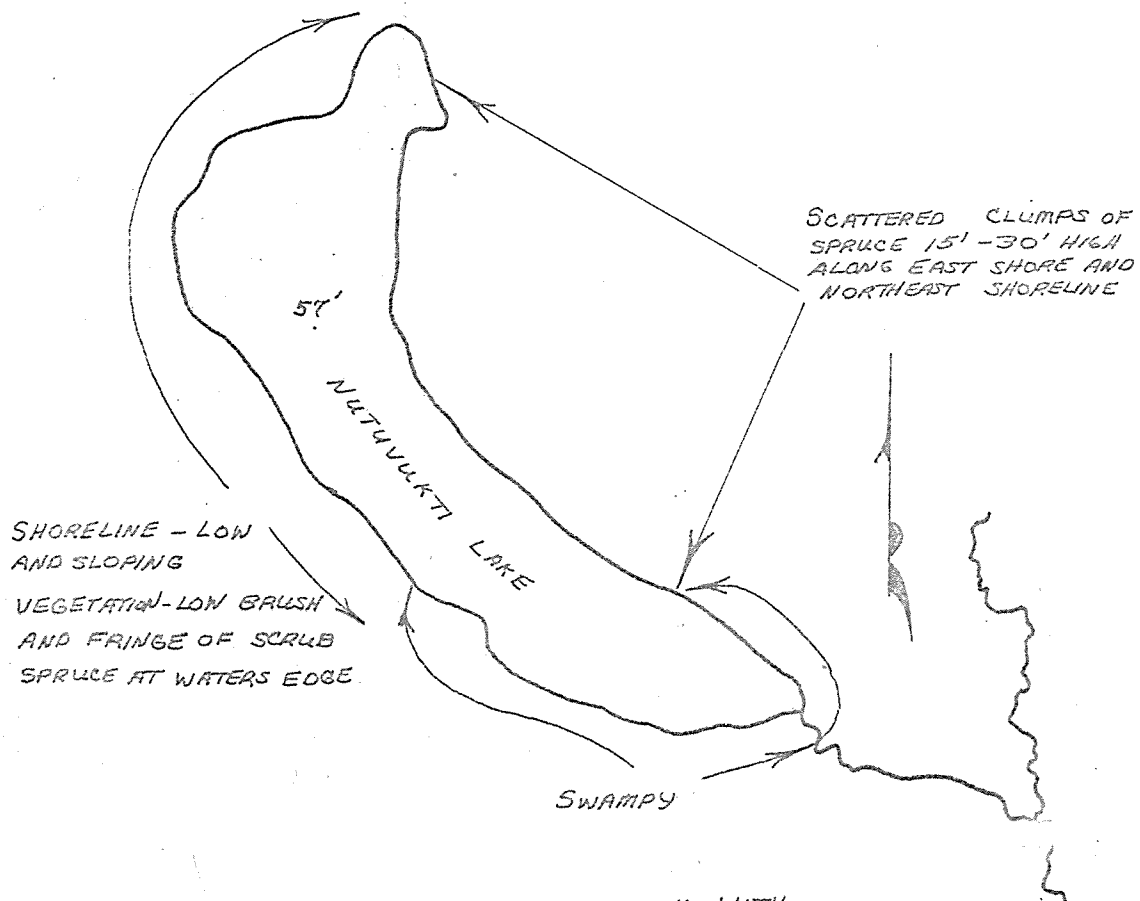
The shore line of this lake is mostly low and sloping with vegetation consisting of scattered clumps of spruce, which is prevalent on the east and northeast shores. (It is estimated that 75% of the shore line is subject to swampiness.) Flooded willow growth occurs along most of the shore line, but there are occasional dry areas of ground which are scattered around the shore line.

One depth reading of 57' was made in the middle of the lake. It does not appear that the lake is too much deeper than that, at least on the north end.

A gill net set in the lake produced whitefish of over four pounds and northern pike over eight pounds.

The outlet to the lake is very swampy, and there does not appear to be a discernable inlet. The most valuable lands from a public use standpoint on the lake are probably in the north and northeast corners; however, it is felt that the entire lake shore should be classified for further study. (See Fig. 6)

Fig. 5



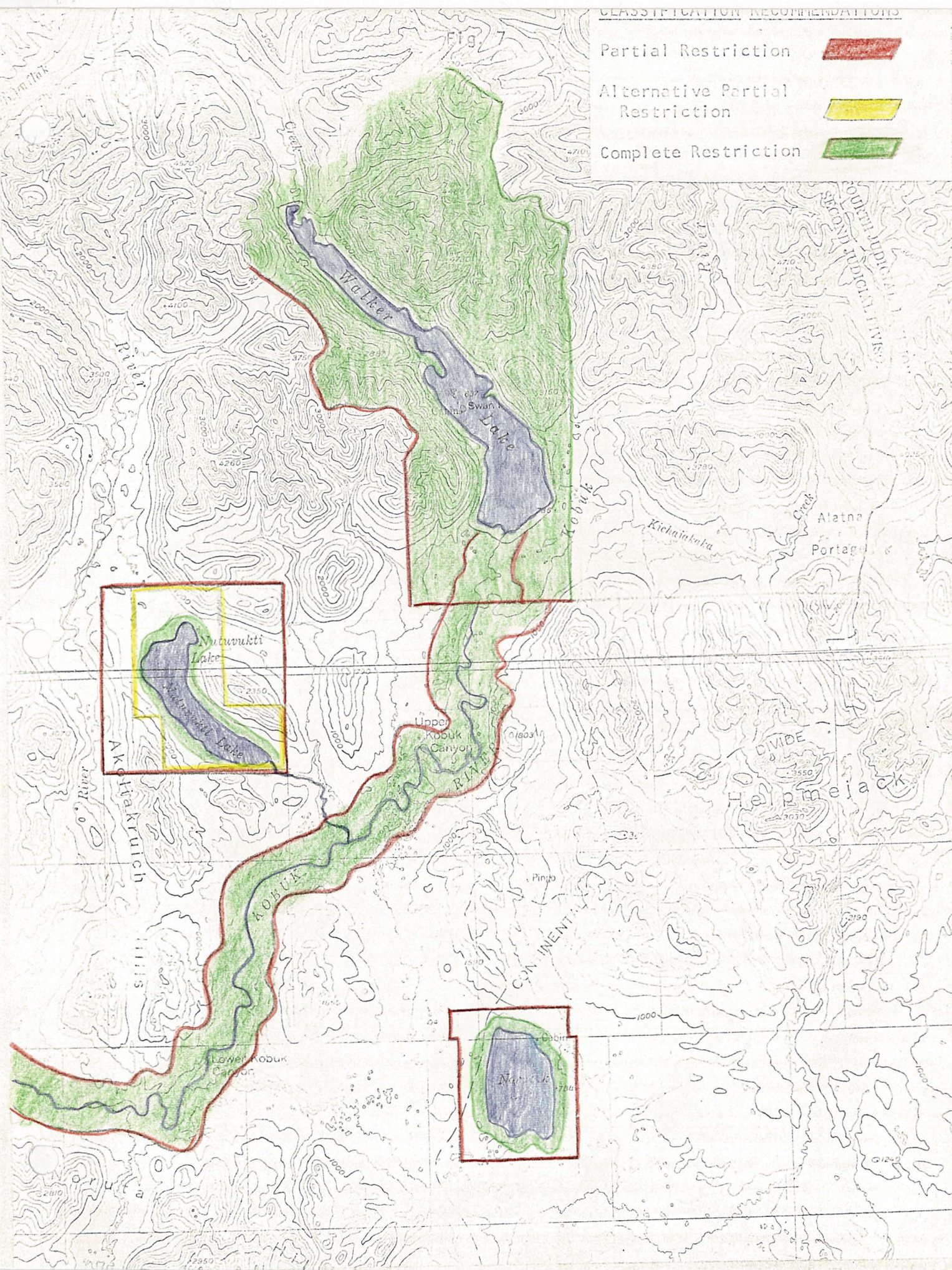
SHORELINE IS FLOODED WILLOW GROWTH WITH
INTERSPERSED AREAS OF GOOD GROUND UP TO
THE WATERS EDGE. ESTIMATED 75% OF LAKESHORE
SUBJECT TO SWAMPINESS

1 MILE

CLASSIFICATION RECOMMENDATIONS

- Partial Restriction 
- Alternative Partial Restriction 
- Complete Restriction 

Fig 7



WALKER LAKE

Walker Lake

This lake is one of the two major lakes in the complex. It is judged to be the superior lake of the group because of its size, scenic setting, apparent fishery, shore line, and shore line vegetation. Selby-Nervak Lake is, in my opinion, secondary to Walker Lake, mainly because of the steep shore lines and relatively few sheltered coves.

Nearly all of Walker Lake's shore line is suitable for, or perhaps subject to, development. There are few places so steep that some type of building could not be built, nor are there any swampy areas.

Vegetation surrounding the lake varies from heavy stands of tall spruce near the inlet of tributary streams to a nearly barren lichen and tundra cover with scattered scrub spruce, such as on the south end. All sites on the lake have some feature that would make them suitable for public or private use.

There are a number of areas that are of prime importance, and they have been designated A-G on the drawing. These are the areas that protection should be placed on immediately, as they will be the first to be filed on in the future. Private land claims have already taken the best island and one of the good coves.

There is very little shallow water in Walker Lake and, in even the short distance between the large island and the west shore, a depth of 105' was recorded. The maximum depth of the lake is not known.

Nets were set twice just off the large island and a lake trout of over 19 pounds was taken, as well as Arctic Char of six pounds. A number of whitefish and grayling were also netted in the 13" to 15" category.

It is recommended that a classification be placed on the entire lake while management plans are worked out through cooperation with other public groups.

The lake is in the critical area; however, it is recommended that the classification be expanded north approximately 20 miles to the headwaters of the inlet streams and east through a very beautiful mountain area following the judicial district boundary to include all of the tributary streams to the lake. (See Fig. 6 & 7)

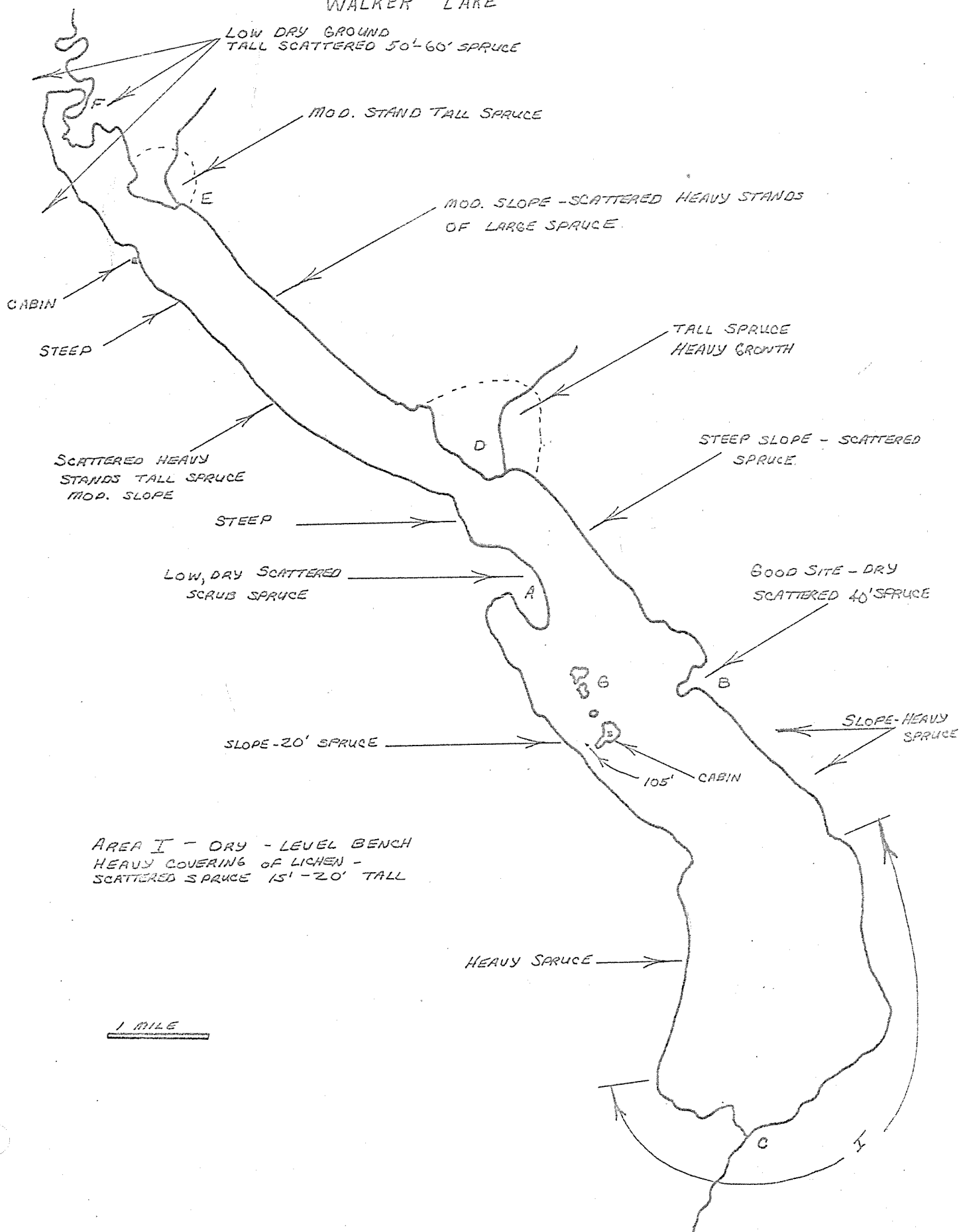
The classification placed on this area should be totally restrictive, thus making the area, for all practical purposes, a wilderness area. With control of the area, we will have a complete drainage system and ecological unit which will be increasingly valuable for research and study in the future, as well as public enjoyment.

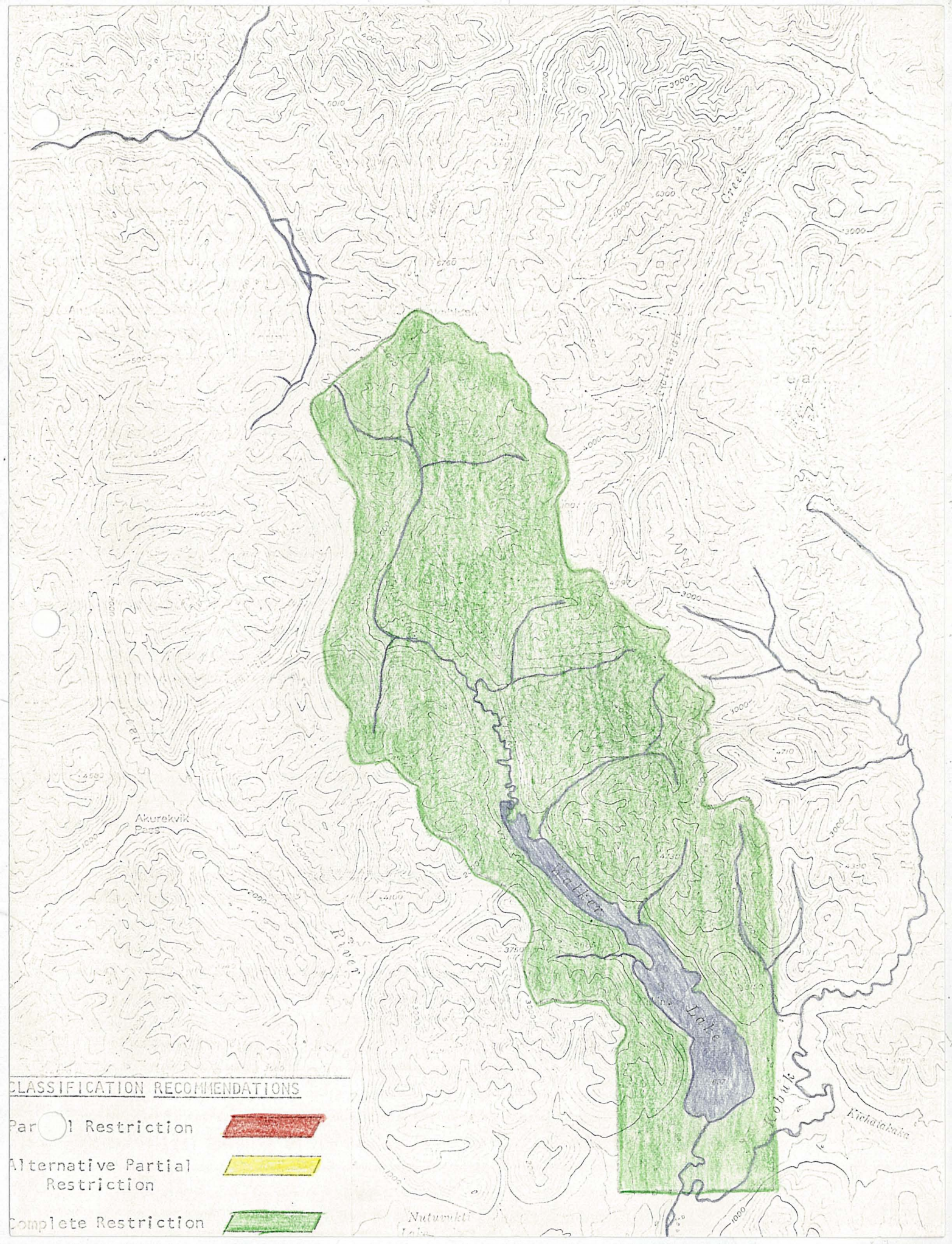
Walker Lake should be reserved in its pristine condition and no further private development allowed. With complete control of the watershed, there is no reason why people should not have a true wilderness lake to visit 50 years from now.

In order to capitalize on this lake's qualities, development of other nearby lakes may be necessary as part of a total management plan for the Brooks Range lakes.

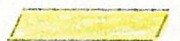
Fig. 6

WALKER LAKE





CLASSIFICATION RECOMMENDATIONS

- Par 01 Restriction 
- Alternative Partial Restriction 
- Complete Restriction 

Helpmejack Lakes

This lake is rated to be a more desirable lake than Nutuvukti or Kollioksak, but lacks one or more features which would make it a top lake, such as Takahula or Minekakosa.

Helpmejack Lake is a relatively small lake located at the edge of the mountains but having no mountains at the lake shore. The lake is bordered by flat ridges on the east and west which slope up gradually from the lake shore. These ridges and the lake shore are covered quite homogeneously by spruce and birch of 20' to 30' height. Some willow occurs along the shore line. The only noted swampy area was on the north end near the inlet. A cursory aerial look at the remainder of the lake shore did not show up any other swampy areas, although the shore line was reported as weedy by Boden in his 1964 report. This might be accounted for by fluctuating water levels.

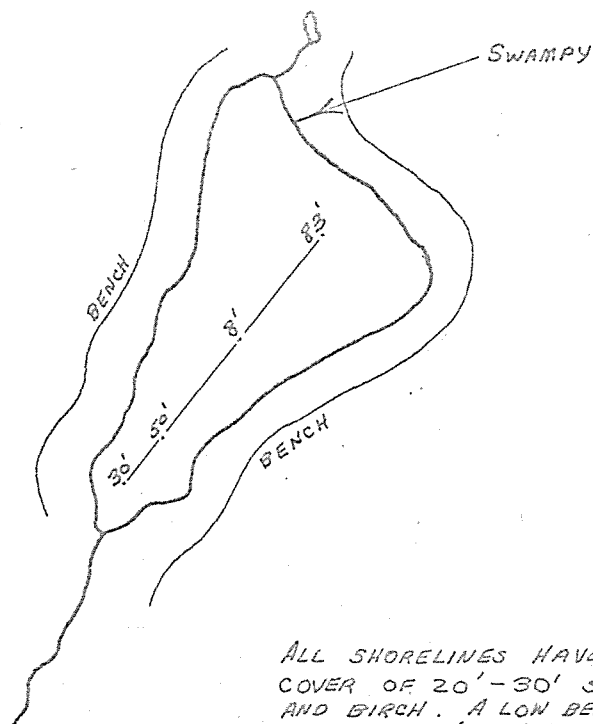
Continuous depth readings were made across this lake with the results shown in the diagram. Maximum depth of the lake is approximately 83 feet. (See Fig. 8)

A net was set in the north end of the lake in which northern pike up to six pounds were taken along with small whitefish and grayling.

There are two small lakes which are located north of the main lake that are quite picturesque. They appear too small for most float operations, but should be considered as part of the Helpmejack Lake group for any development plans or classification.

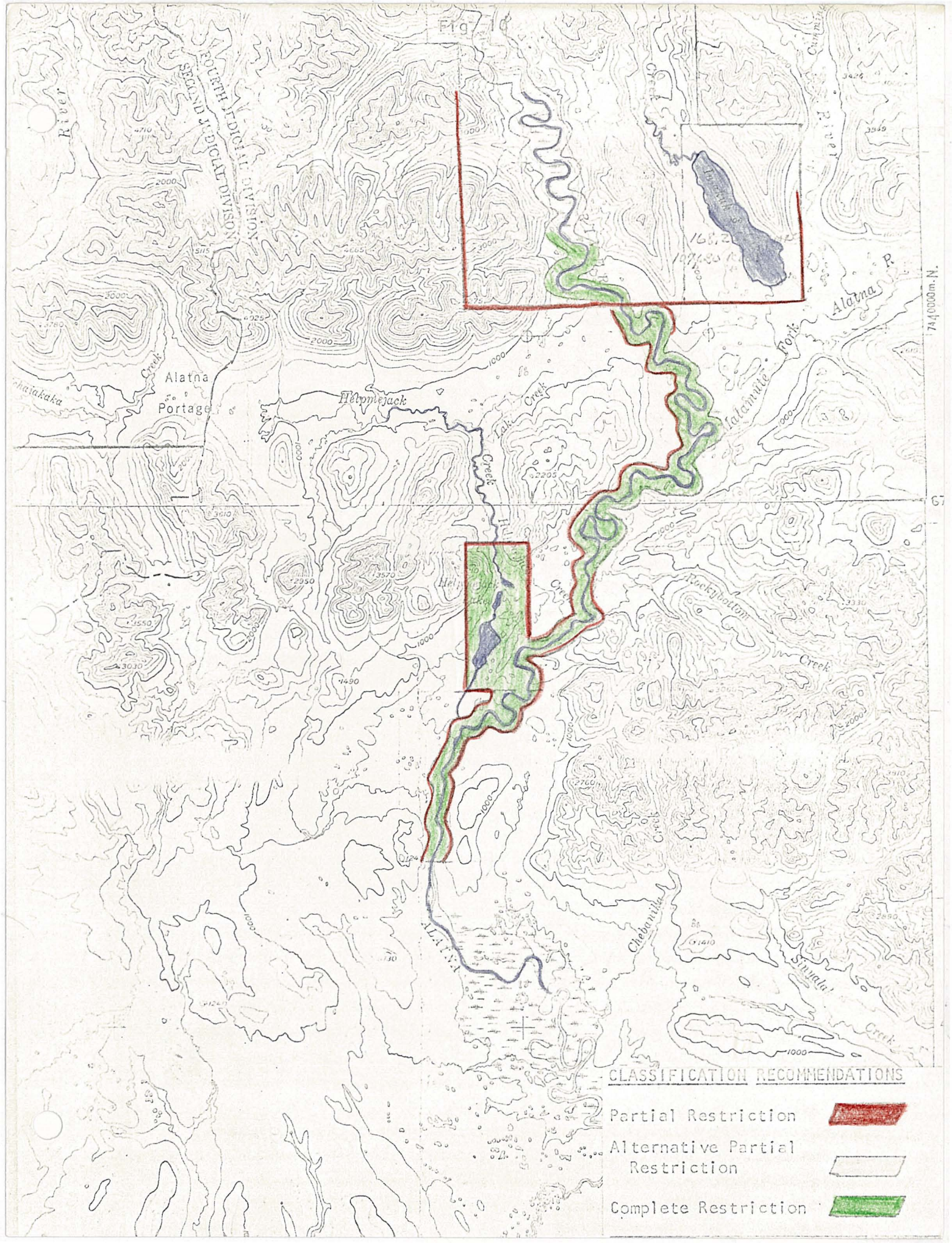
I feel that most areas around the lake would be suitable for development, so it is recommended that a restrictive classification be placed on the entire lake system until definite plans can be worked out. (See Fig. 9)

HELPMEJACK LAKE



ALL SHORELINES HAVE A
COVER OF 20'-30' SPRUCE
AND BIRCH. A LOW BENCH
APPROX. 50'-75' HIGH BORDERS
THE LAKE AND SLOPES TO
THE LAKE SHORE.

1 MILE

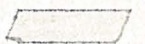


CLASSIFICATION RECOMMENDATIONS

Partial Restriction



Alternative Partial Restriction



Complete Restriction



TAKAHULA LAKE

Takchula Lake

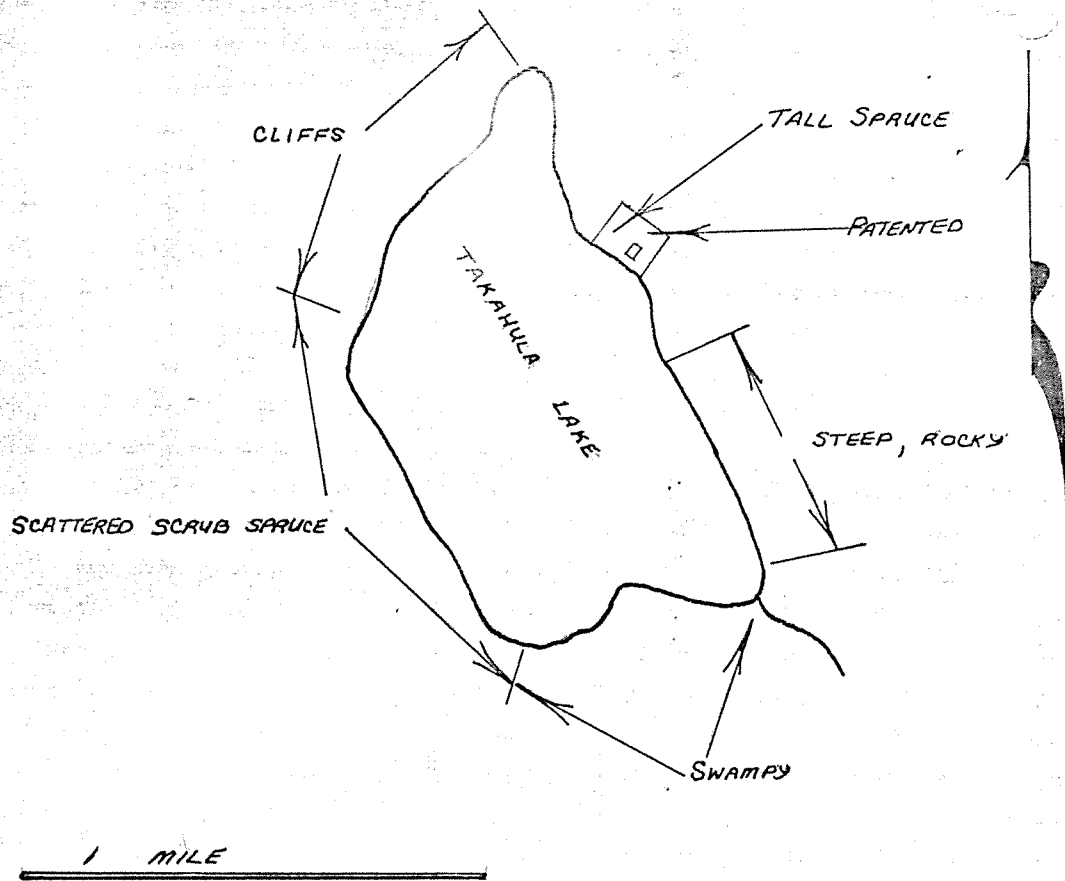
This small lake is very scenic since it is located in high mountains. It is really a lake in miniature, with cliffs coming to the water's edge and patches of spruce clinging to the lake shore. Actually, the lake does not have much shore line that is suitable for physical development. The southeast and northwest sides of the lake have very steep cliffs or bluffs at the water's edge. The southern end of the lake is swampy and unsuitable. The most scenic and usable portion of the shore line is located in the northeast corner where stands of tall spruce occur. The best portion of this area has been patented to a private individual. The largest area of fairly good lake shore, is located on the southwest shore, which is dry and covered with scattered spruce and lichens. Approximately one mile of this type shore line is present.

The depth reading taken at the estimated deepest location was 65'.

Only three fish were caught in a 24 hour netting period and all were northern pike. Two were six and seven pounds, while the other was only 11".

It is recommended that the shore line of this lake be totally restricted and that it be included in a broader classification including this lake, Tobuk Lake, and Iniakuk Lake, and a portion of the Alatna River. (See Fig. 13)

Fig. 11



TOBUK LAKE

Tobuk Lake

This lake is quite scenic; however, much of its shore line is swampy. There are a few spots on the lake shore that would be suitable for development. Several wooded points on the west shore appear dry and level. The most prime piece of ground is a 10 acre island in the middle that does not appear to be swampy along the shore line. In addition, the island is densely covered by 40 foot spruce.

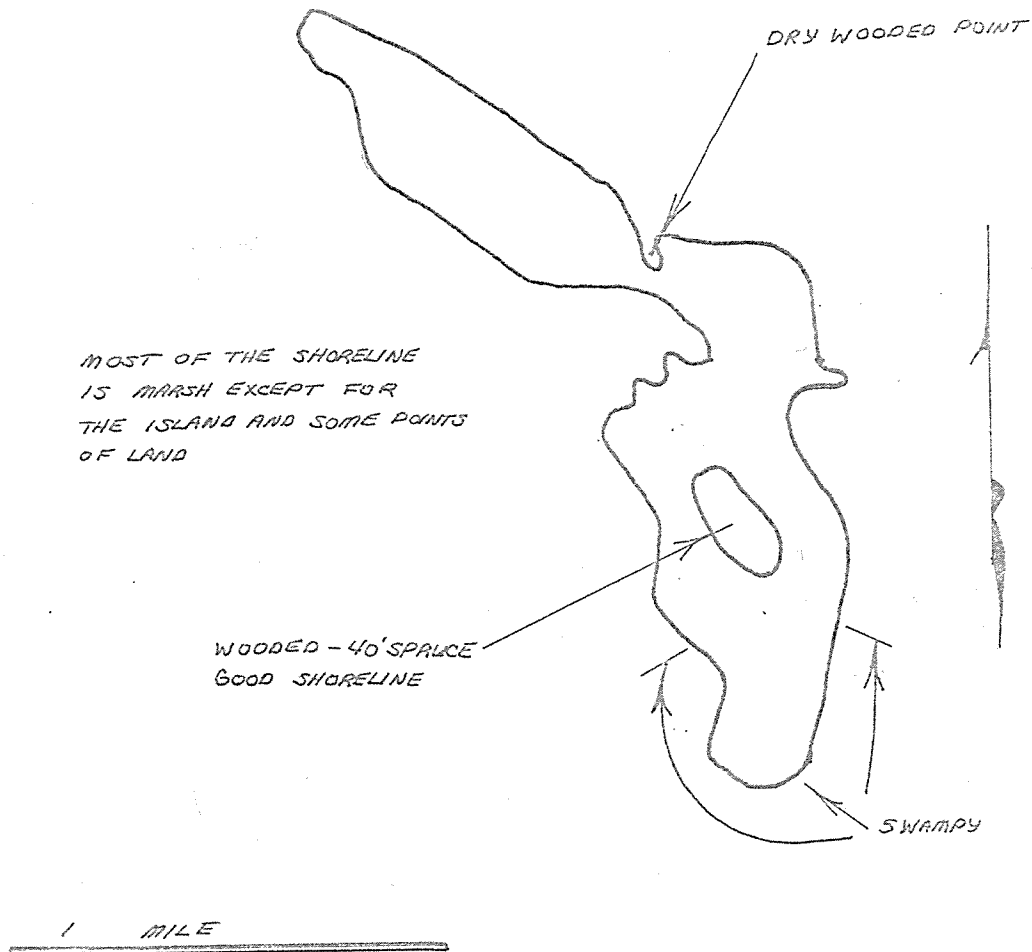
On the shore line of the lake proper, vegetation varies from scattered spruce to scattered dense stands. Most of the spruce is scrubby and not much over 20 feet tall.

A depth of the lake was not taken; however, it was test-netted for a 24 hour period. Northern pike was the only species taken, and they varied in weight from one pound ten ounces to eight pounds ten ounces. It is likely that there are other species present, but possibly not lake trout.

It is of prime importance that the island in this lake be classified immediately. It is recommended that a totally restrictive classification be placed on the island in the lake and the lake shore, and that the lake be included in a broadly classification of Takehula, Alatna River, and Iniakuk Lake.

Fig. 12

TOBUK LAKE



INI AKUK LAKE

Iniakuk Lake

This lake is rated as one of the better medium to large lakes because of its clean usable shore line and vegetation.

It is the only one of the lakes in the group inventoried that has good beaches. The southwest side of the lake has many points, coves, and beaches which would make the lake ideal for development. There are few, if any, swampy areas.

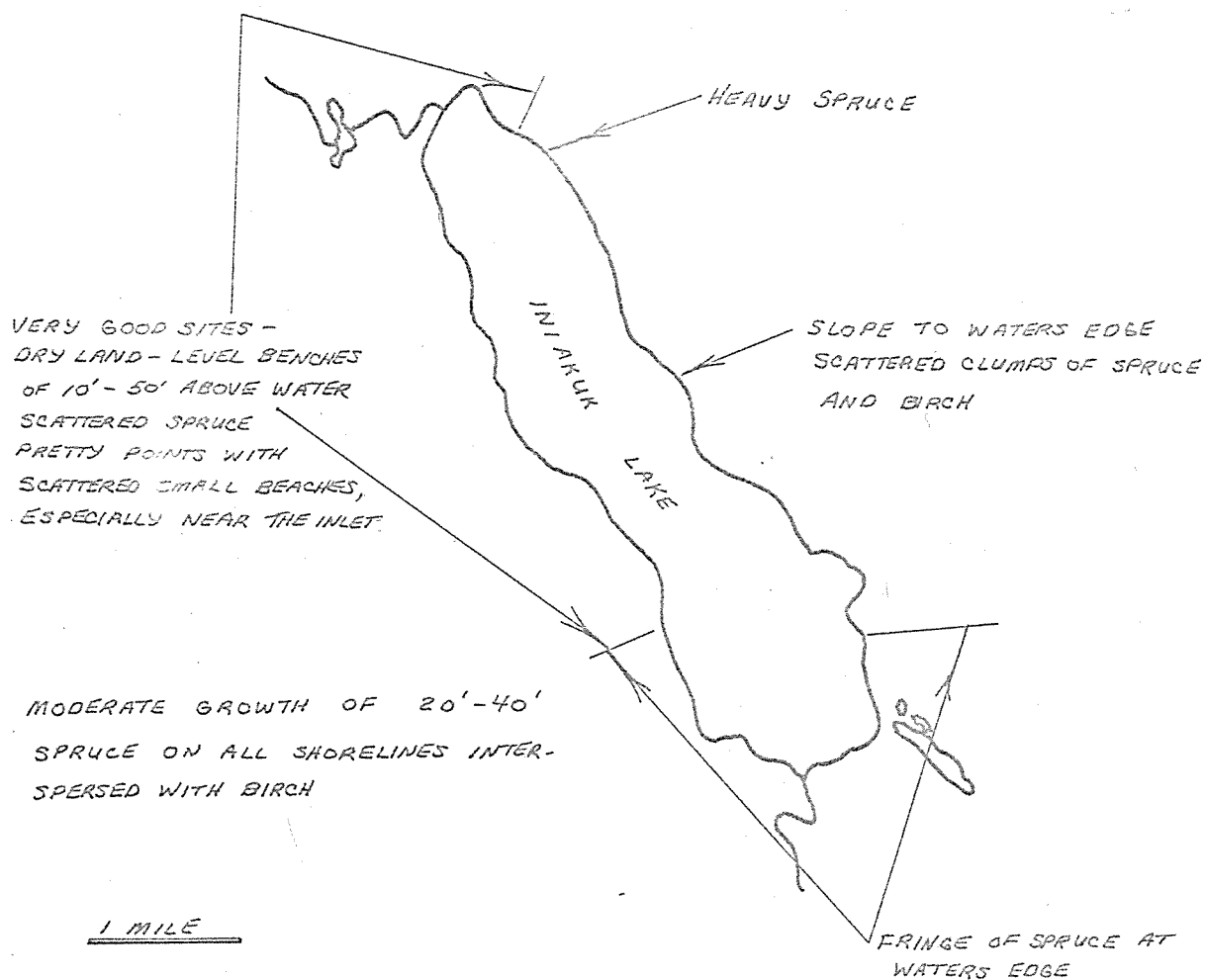
Vegetation surrounding the lake consists of varying degrees of density of spruce 30 feet to 40 feet tall interspersed with white birch.

A depth of 102 feet was recorded for the lake. The only fish taken during two netting periods were small northern pike and whitefish of nearly seven pounds.

This lake might be suitable for commercial development as a lodge site with fly-in facilities to the other nearby lakes. There has already been interest expressed in such a development; however, no land filings have as yet been made.

It is recommended that, for the present, this lake remain a wilderness lake and that any development in the Walker Lake complex be shunted to a lake, such as Norutak, which does not have the scenic or wilderness potential of Iniakuk. Possible classification alternatives are shown in Figure 13.

Fig. 13



Complete Restriction



PHOTOS



JERRY WICKSTROM AND SIX POUND ARCTIC CHAR, WALKER LAKE, 1967



A NETTING OF TROUT AND WHITEFISH. THE LARGEST TROUT IN THE FOREGROUND WEIGHS NINETEEN POUNDS AND CONTAINED A TWO POUND LAKE TROUT WHEN NETTED



APPROXIMATELY SIX POUND ARCTIC CHAR TAKEN AT WALKER LAKE 1967



VIEW OF WALKER LAKE LOOKING NORTH



GENE ROGUSKI AND TOM NAGADA OF ADF & G WEIGHING A NORTHERN PIKE AT WALKER LAKE JULY 1967



TYPICAL SHORELINE OF WALKER LAKE SHOWING SCATTERED BLACK SPRUCE PATCHES, DWARF BIRCH, AND
LICHEN COVER



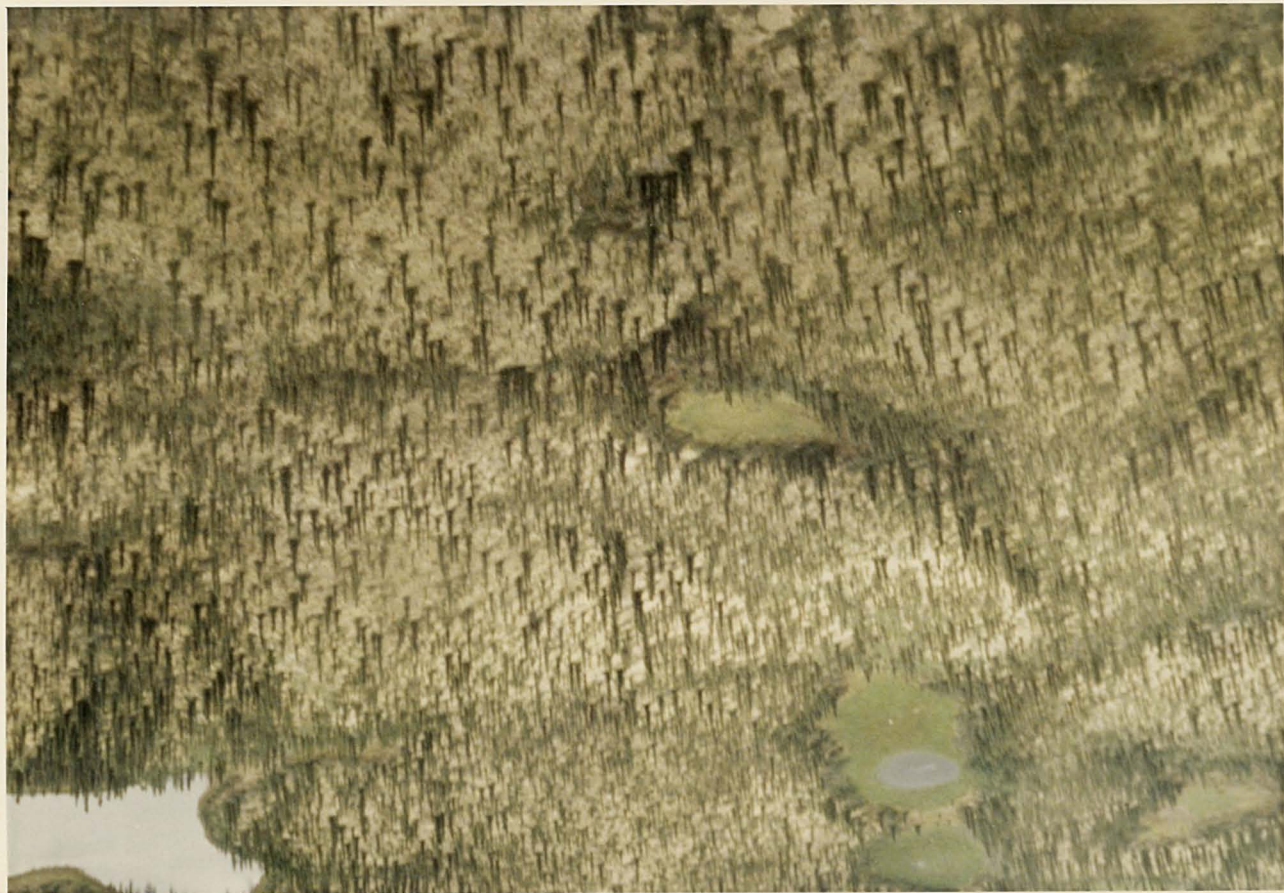
AERIAL VIEW OF MINAKAKOSA LAKE LOOKING SOUTH



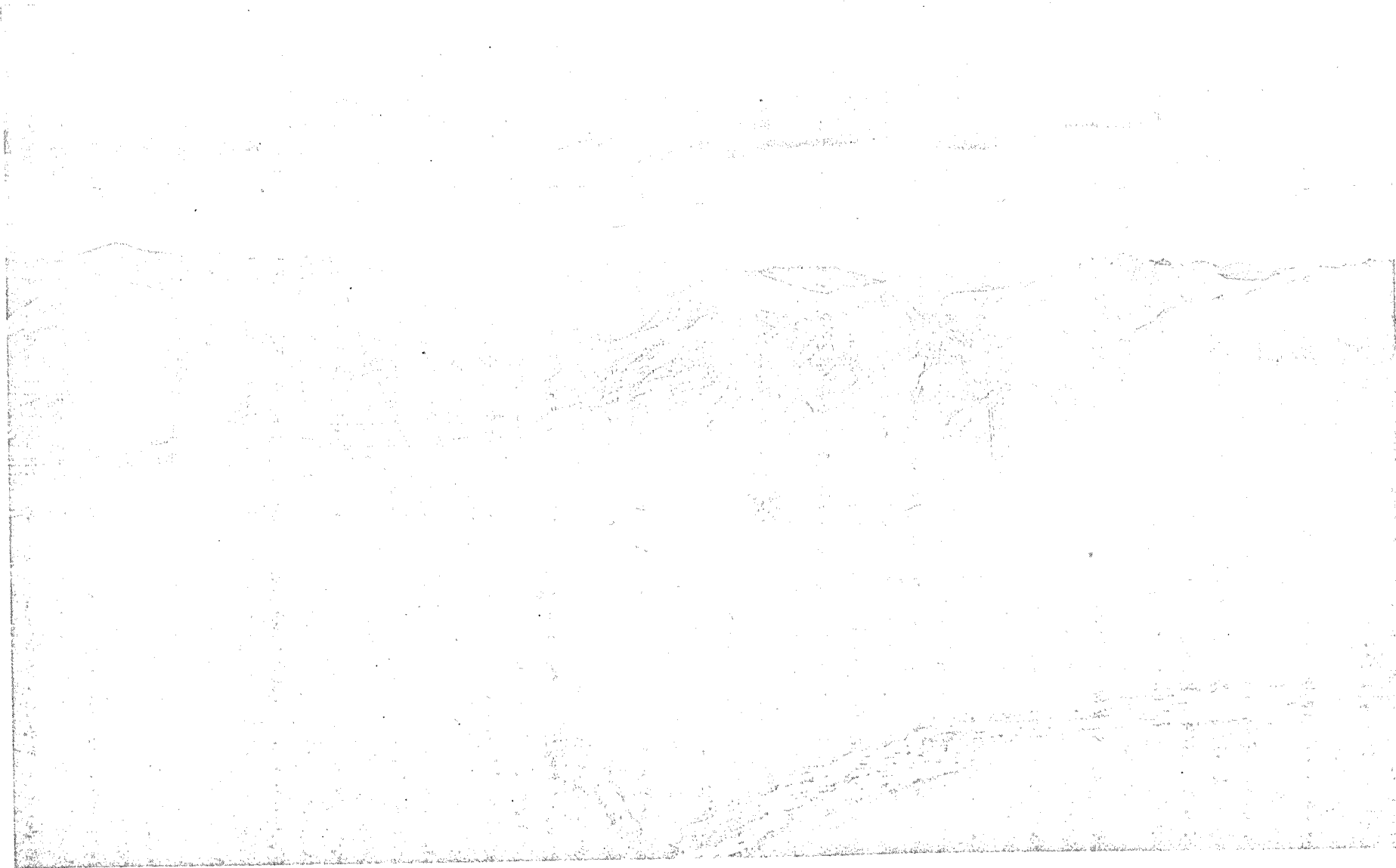
SOUTH END OF WALKER LAKE SHOWING VEGETATIVE CHARACTERISTICS, JULY 1967



KALULUKTOK CREEK LOOKING SOUTH TO WALKER LAKE



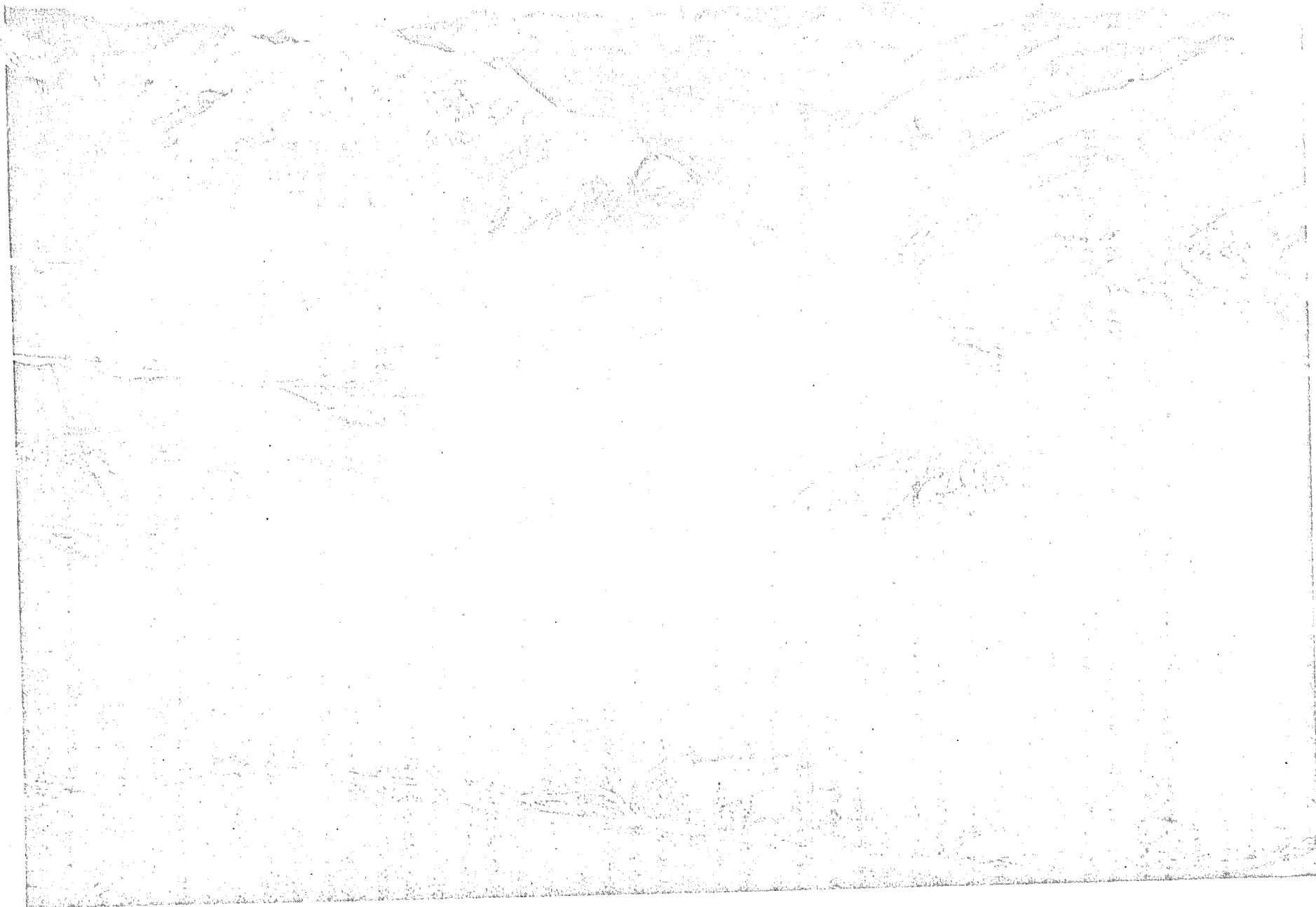
AERIAL VIEW OF TYPICAL VEGETATIVE COVER SHOWING SCATTERED BLACK SPRUCE WITH HEAVY LICHEN GROWTH ON THE SHORE LINE OF THE SOUTH END OF THE LAKE



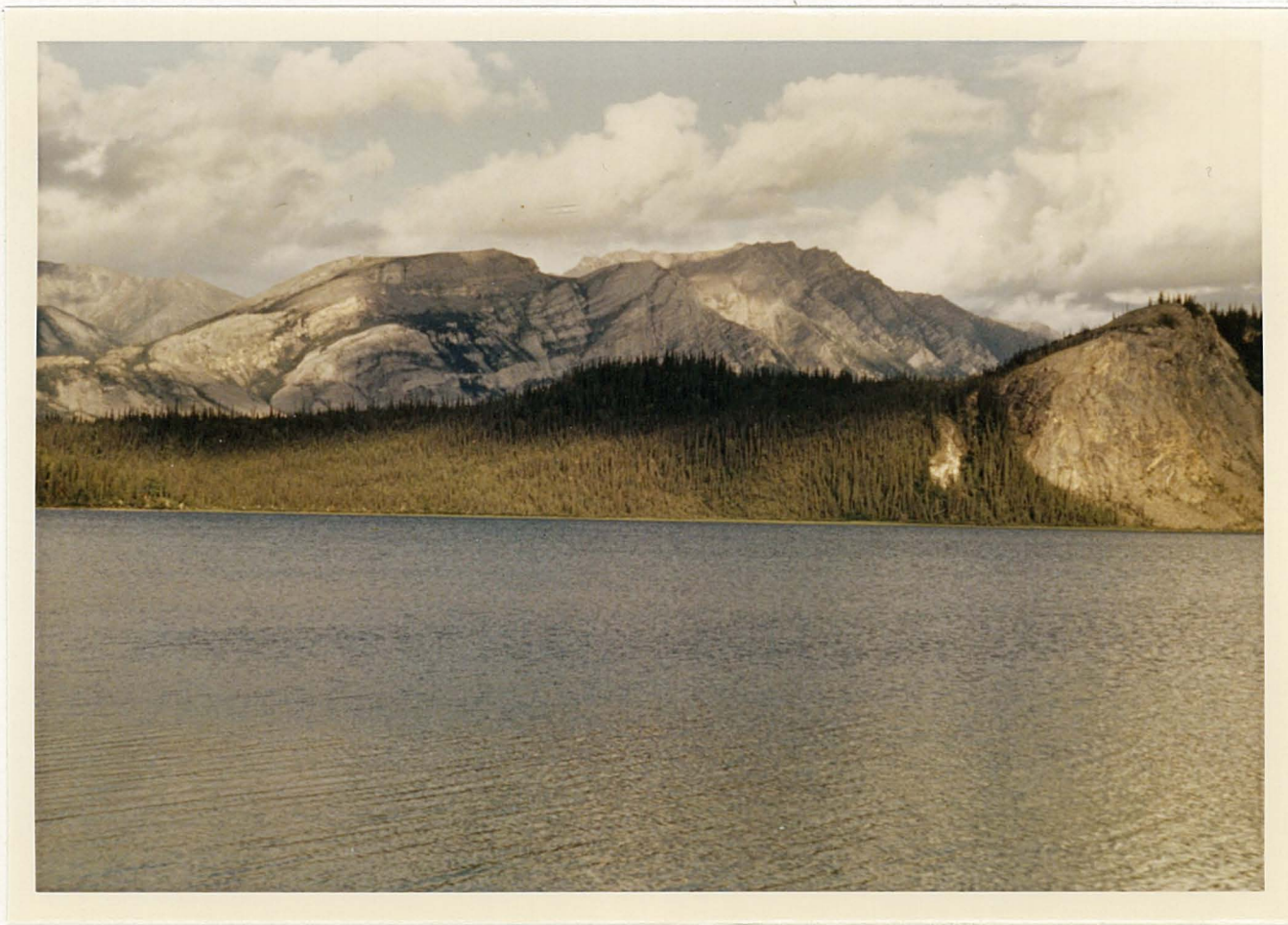
TOBUK LAKE



AERIAL VIEW OF INIAKUK LAKE



AERIAL VIEW OF TAKAHULA LAKE



VIEW OF TAKAHULA LOOKING NORTHEAST

Summary and Conclusions

SUMMARY:

The Brooks Range lakes are probably the most isolated wilderness lakes remaining in the United States. Even so they are already being touched by the hand of man as evidenced by the cabins, camping areas and litter beginning to appear on their shores. These lakes are receiving attention not only by prospective land filers, but by concerned scientists and conservationists. As the most remote and least exploited scenic mountain lake region of the United States there is increasing interest in acquiring land on these lakes for use as hunting and fishing cabins, business sites and in general a place to get as far away from civilization as possible.

In the entire Brooks Range there are only forty major lakes which can be considered to have most of the classic qualities such as deep, clear water, large sport fish, mountain settings and vegetation on the shorelines. These lakes are listed within the report. All but two are on BLM administrated lands and have not as yet been classified or withdrawn.

The lakes are the epitomy of wilderness and natural beauty and like many beautiful things are relatively fragile. Their Arctic location with its cool climate and short summer season has produced an ecosystem that is effected very quickly by outside influence such as man and recovers very slowly. For instance, there are indications that the cold, relatively unproductive waters of these lakes can be polluted very easily by permanent human populations on the shoreline. Luxuriant climax type lichen growth occurs around some of the lakes. This is easily destroyed by trampling and fire, and such damaged growth may take up to four hundred years to recover.

Two BLM studies have been made of these lakes. A recreation inventory of most of the lakes was made by Wayne Boden in 1964. As a result of this survey, Mr. Boden made recommendations for very limited prime areas on each lake to be reserved for the public. The Classification and Multiple Use Act was not in effect at that time so the area that could be protected was very limited in acreage and scope. Since then the Classification and Multiple Use Act has come to pass and will enable a broader consideration of the Brooks Range area for total multiple use management. Information on fisheries population, rate of growth and condition were lacking for nearly all of the Brooks Range lakes. In an effort to obtain some indications of these factors a cooperative BLM - Alaska Department of Fish and Game study was initiated in the summer of 1967 on the lakes in the Walker Lake Recreation Complex. Depths

were spot checked, nets set in each lake for sampling and shoreline and vegetative characteristics noted to a degree consistent with the time available. The resulting conclusions of the ADF & G on the fisheries portion of the survey are included within this report.

It must be understood that the fisheries information presented, because of the limited samples, can be considered only as a preliminary study. Much additional work is necessary before final conclusions can be drawn. Additional studies are included in the 1970 program studies packages for an intensive ecological and limnological study of one lake, possibly Walker Lake. This further study would be done through support of a graduate program at the University of Alaska. Walker Lake has been designated by the National Park Service as a natural historic landmark.

These preliminary and very rudimentary fishery investigations have found that fish growth is slow in these northern lakes. A large northern pike, 31.5" in length, taken in Tobuk Lake was found to be over eighteen years old while another 30.5" in length, netted in Selby Lake was twenty-three plus years of age. A lake trout taken at Walker Lake, 33" long and weighing over nineteen pounds, was found to be over thirteen years of age. (See page 11 of the Fish and Game report.)

Northern pike in the Brooks Range lakes grow considerably slower than those in the Minto Flats near Fairbanks. Lake trout growths are nearly the same at Summit and Paxson lakes but their condition is much poorer. The slow rate of fish growth is an indication of the factors that must be considered in development of any long-range management plan. Since the ecology of the area is so delicate, extreme care must be taken to prevent irreversible actions on the landscape.

Shoreline observations in the August 1967 study were made from both an ecological and development standpoint and a report was prepared recommending certain classification procedures on each lake. (See BLM report.) Based on the conclusions arrived at for the lakes in the Walker Lake complex, classification recommendations were then made for all the lakes being considered in the Brooks Range. On all areas other than Walker Lake an effort was made to make the classification boundaries follow cardinal directions. In the case of Walker Lake the boundary of the classification area follows natural boundaries and is consistent with the National Park Service - University of Alaska recommendation. (See report.)

It is my opinion that these lakes and river systems are the last vestiges of the virgin arctic alpine reaches that contain significant

recreation value and wilderness attributes and that they should be protected to a maximum degree. In general, complete restriction for the entire Brooks Range lake system is recommended for all areas blocked out on the attached map. In the Walker Lake Complex, the minimum recommended completely restricted area is shown in green. Other key lakes such as Selby, Iniakuk, Chandler, Tobuk and Takahula, should be completely reserved. It may involve a little horse trading with the mining interests to achieve this. The blocked out areas, if restricted, will not provide complete protection for the wold, caribou, or sheep habitat, but may in some instances be large enough to include the home range of the black and grizzly bears and many of the smaller species of animals and birds, such as listed by Dr. Dean in the enclosed report on Walker Lake. Protection cannot be accomplished without complete control. If a miner decides only to prospect along the shoreline or needs an access road bulldozed up the side of the lake, these values will be destroyed.

Like all Bureau classifications these areas are subject to change and probably should be modified as more is learned about them. Between the restricted areas of classification a much looser classification will be applicable restricting only those forms of disposal that are incompatible with the resources present. It is plain to me for instance, that the homestead law has no place in the Brooks Range and should be entirely excluded. At this time it is not so apparent how the other settlement laws are abusive to the natural resources of the area once the critical areas are protected. As an example, after a discussion with Cal Niver, Fairbanks District's Realty Specialist, we formulated a method of achieving maximum use of the Walker Lake complex lakes without destroying their wilderness aspects. Within the Walker Lake complex one centrally located lake, such as Noratak, can be developed as a service center for guides, fishermen and recreationists who will be within on half hours flight of the other lakes and rivers in the complex. Noratuk Lake, while scenic, is a lake of the more ordinary variety and can serve as a sacrifice area to preserve the remainder in a more wilderness state. This is not to say that completely uncontrolled development would be allowed on Noratuk. A complete land use plan should be developed. This same type of satellite development can be worked out for other groups of lakes in the Brooks Range.

CONCLUSIONS:

From a wildlife, ecological, aesthetic and natural history viewpoint, I believe that the maximum restrictions possible should be placed on the indicated blocked out areas around the Brooks Range

lakes and streams. This will mean complete reservation of approximately 5% of the Brooks Range classification area or approximately 2,500,000 acres. Complete restriction as recommended may not be possible in all cases in the light of mineral occurrences or transportation needs. Other areas such as the Noatak River areas will require further examination and possible protection.

As roads and railroads penetrate the area some of the lakes and rivers of the region are going to be accessible by land. There will be settlement and destruction of some of the values we hold dear to the area. I hope, however, that a person will be able to visit the Brooks Range fifty years or a hundred years hence and find at least a few major lakes in a wilderness condition. Some remnants must be preserved if only as museum pieces so that people two hundred years hence will be able to believe that such clear, beautiful, wilderness lakes and streams actually did once exist.

Jerry C. Wickstrom
Wildlife Biologist

LAKES OF INTEREST

IMPORTANT BROOKS RANGE LAKES CONSIDERED FOR CLASSIFICATION

USGS MAP - 1/250,000

LAKE OF INTEREST

Mt. Michelson

Peters Lake (Arctic Wildlife Refuge)
Schrader Lake (Arctic Wildlife Refuge)

Arctic

Old John Lake
Portage Lakes
Porcupine Lake

Chandalar

Chandalar Lake
Ackerman Lake
Squaw Lake
Twin Lakes
Big Lake

Phillip Smith Mountains

Itkillik Lake
Galbraith Lake
Sagavanirktok Lake

Chandler Lake

Chandler Lake
Amiloyak Lake
Agiak Lake
Natvakruak Lake
Shainin Lake
Nanushuk Lake

Wiseman

Loon Lake
Wild Lake

Killik River

Kurupa Lake
Cascade Lake

Survey Pass

Walker Lake
Nutuvukti Lake
Takahula Lake
Iniakuk Lake

Hughes

Selby Lake
Narvak Lake
Minakokosa Lake
Norutak Lake
Helpmejack Lakes

Shungnak

Kollioksak Lake

Ambler River

Anirak Lake
Matcharak Lake
Amitchiak Lake
Kipmik Lake

(Continued)

USGS MAP - 1/250,000

LAKE OF INTEREST

Misheguk Mountains

Aniralik Lake
Narvakrak Lake
Okoklik Lake

Howard Pass

Liberator Lake?
Feniak Lake

REPORT NPS

SITE EVALUATION REPORT: WALKER LAKE, ALASKA

(N.P.S. Purchase Order #126-318)

INTRODUCTION:

Walker Lake was suggested as a natural landmark by Dr. Frederick C. Dean, Head, Department of Wildlife Management, University of Alaska, who supervised a biological survey of the area during the period 22 July through 5 August, 1963; work done by the members of Dean's party was limited to the north end of the lake. This lake provides a striking example of the geological and biological relationships of a mountain lake at the northern limit of forest growth on the south slope of the Brooks Range. It is typical of the many glacial lakes formed in rock basins or behind moraine dams along both flanks of the Brooks Range. A full range of ecological communities from Walker Lake's dense white spruce (Picea glauca) forest on its shores to the barren talus slopes 2,000 feet above the lake document the rapid biological change in a markedly compressed linear distance. A limited amount of literature exists on the geology and biology of the Walker Lake area; the more important references are listed at the end of this report. I have not tried to compile an exhaustive bibliography on this area since several workers have made brief stops at the lake; I do not know all of their names, and their reports are widely scattered in both the published literature and government files.

LOCATION, SIZE, AND EXTENT:

Walker Lake (67°07'N, 154°30'W) lies on the south slope of the Brooks Range in northern Alaska, nearly at the head of the Kobuk River. It is approximately 250 air miles northwest of Fairbanks, Alaska, and is readily accessible by float plane from Fairbanks, Bettles Field, and Kotzebue. This proposed natural landmark site at Walker Lake contains about 283 square miles (181,236 acres) and would include the lake and its principal tributary, Kaluluktok Creek (Fig. 1).

OWNERSHIP AND LAND USE:

The Bureau of Land Management administers this area for the U. S. Government; only two private claims are known to be located on the shores of the lake, but others may exist within the boundaries of this proposed area; a check of BLM land records has not been made. Land use is restricted primarily to recreational hunting and fishing. A limited amount of scientific study has been done in the area.

DANGERS TO INTEGRITY OF AREA:

The fragile lichen community, an outstanding feature of Walker Lake because of its extreme age, lush growth, and variety of species, could be totally destroyed by wild fire or through trampling by large crowds of visitors to this natural landmark site. Fire has occurred infrequently, as indicated by the age of existing white spruce and the lichen growth, and with proper management a satisfactory program of visitor management could prevent the destruction of these biological communities.

Perhaps a significant danger to the area arises from the fact that the lake supports very good fishing which is bound to become more widely known and more extensively exploited. As the use of the area increases from a recreational standpoint there is bound to be an impact on the shoreline vegetation since there are relatively few places to moor a plane. This restricts the points of access on the lake itself, consequently funnelling the visitor impact into a relatively few areas. The lake is probably large enough so that recreational use, at least any moderate level, could be continued without any real danger to the area; however, it would be good to consider this factor in planning for any recognition of the area as a natural landmark. The administering agency might have to keep a special watch to avoid damage to the area as a result of visitor activity. I doubt very much that there is any danger to the fish populations themselves for many many years.

DESCRIPTION OF NATURAL VALUES:

Walker Lake is nearly at the head of the Kobuk River and probably supplies as much or more water as does the other branch. The lake shore is between 600 to 800 ft. above sea level, and many of the peaks surrounding the lake surpass 4,000 ft. Some exceed 5,000 ft. The lake itself is nearly 14 miles long, and even the narrower part is over a mile wide in most places. The lake runs in a northwest to southeast direction and lies in a narrow valley between steep mountains having relatively great relief. The northern half of this narrow valley is filled with sediments through which Kaluluktok Creek has cut a channel which is relatively straight except in the lower one-quarter. There the creek begins to meander, forming broad curves with mud bars on the inside bends and having steep banks on the outside bends. Walker Lake itself occupies the lower half of the valley, spreading from wall to wall. The southern terminus of the lake is apparently blocked by a moraine.

Almost all of the land is in the form of very steep slopes, sharp ridge tops, and moderately high peaks. The upper ridges are relatively sharp-backed and the peaks are jagged. The lower ridges are rounded, weathered, and, on their lower slopes, composed of jumbled piles of large boulders. The lateral drainage in this region is characterized by narrow, cascading streams. The topography in the immediate vicinity of the camp at Walker Lake is really of only two types, flat and steep. The former, including the surface of the lake, covers roughly 20% of the zone within the 5-mile radius of the camp site. Nearly all of the remainder of the area is steep.

The geologic map (Smith and Mertie, 1930) provides information only for the areas that are immediately adjacent to the lake. The southern terminus of the lake abuts an area of quaternary sediments. The flanks of the lake are for the most part bounded by highly metamorphosed rocks of early Paleozoic or older age. There are apparently many kinds of rock involved. Smith and Mertie show some areas of Skagit limestone in the vicinity of the lake. While their map does not show any of this kind of rock in the immediate vicinity of the northwest corner of the lake, we found large expanses of limestone outcropping above our camp. The area to the west of our camp was characterized by sharp interfaces between the major forms of rock.

Kaluluktok Creek is forming a small delta which has changed its shape considerably as time has passed. The waters of the creek are normally clear, so that delta-building occurs principally after heavy rains and during the spring runoff. At such times one may see the pattern made by the muddy water being injected into the crystal-clear waters of Walker Lake; probably a geologist would consider that the rate of delta accretion is comparatively rapid, but to biologists considerable time has yet to elapse before the delta has closed across the north end of the lake.

The lake itself has strikingly parallel sides that make a gentle arc as the valley trends to the southeast. Although no soundings were made, it would be expected that at least the north end of the lake is quite deep. At several points along the shore we were able to stand on bluffs and look directly into water which was deep enough to prevent one from seeing the bottom although the water itself was very clear.

Within 5 miles of the camp site the dominant habitat forms are open spruce forest (25%), tall shrub (25%), dry tundra (30%), standing waters (5%), and bluffs-slides-outcrops (10%). Other types which are present in small amounts include

low shrub, tussock-heath tundra, sedge-grass marsh, and flowing waters. There are also obviously such types as alluvial deposits and riparian cut banks, however, these make up a very small proportion of the total. As was stated above, Walker Lake occupies the valley floor from one mountain wall to the other. Above the edge of the lake, the slopes are covered with open spruce forest which has a very light admixture of deciduous trees, principally birch. There is, throughout the greater part of the spruce forest, a dense understory of tall brush. This spruce forest extends up most of the mountain slopes to a height of between 2,000 and 3,000 feet above sea level. Beyond that point it is irregular and represented only by scattered small stands.

On the valley floor to the north of the lake there is an extremely dense growth of tall shrub. This is spotted with small stands of spruce, but no extensive areas of forest. Much of the spruce which does grow in the Kaluluktok Valley is found along creek banks and in areas of old oxbows. There are some isolated, small stands of poplar along the creek as well. On the sides of the mountains the open spruce forest gives way to tall shrub areas which are composed in the most part of alder and tall willows. Above this there is a zone of scattered low shrubs intermingled with tall herbaceous growth, principally grasses. Finally on the crests of the mountains, and extending well down their sides, there is dry tundra.

The area at the head of Walker Lake has been without fire for many years. There are extensive stands of mature lichens. In addition, the abundant spruce growth which accumulates slowly testifies to the long interval since the last burn. Walker Lake is a northern outpost of the interior spruce forest. The region around the lake is generally well-drained; the mountain slopes are steep; and the altitude of the mountains is considerably greater than that of the low hills bordering many of the valleys to the west. Many areas of rock outcrop occur, and there are numerous talus slopes which have in general become overgrown. Outside of the 5-mile radius from the camp many of the mountains appeared to have large expanses of bare rock and talus, but within the 5-mile radius the mountain-tops were generally vegetated with dry tundra except on the peaks.

Walker Lake, deep, clear, and cold, is comparatively sterile from the standpoint of vascular plants. There is a bed of Chara over much of the bottom. Kaluluktok Creek is likewise clear; it flows through the study area without significant grade. Like many of the streams in the Brooks Range, Kaluluktok

Creek responds very rapidly to heavy runoff, carrying large amounts of sediment as well as a greatly increased volume of water. At the north end of the lake there are two areas of delta formation, one that of Kaluluktok Creek which is by far the largest and the second which is being jointly built by two smaller tributaries that come in from the northwest. On these delta areas there are stands of sedge-grass marsh of the usual uniform type.

Geological Features of Special Interest. Walker Lake occupies a deep rock basin eroded by a valley glacier which flowed south from the central Brooks Range into the upper Kobuk Valley. Moraines and outwash south of the lake were formed near the end of the Late Wisconsin glacial stage, and represent the final episode of large-scale valley glaciation in the Brooks Range. Well-preserved arcuate end moraines south of the lake are associated with outwash terraced and kame-and-kettle topography; lateral moraines, ice-marginal drainage channels, and kame terraces extend north from the end moraines along both valley walls.

Highlands surrounding the lake exhibit many erosional features of alpine glaciation. Faceted ridge spurs reflect the tendency of ice streams to widen and straighten their valleys while the smoothed and streamlined upland topography illustrates the abrasional effects of overriding glacier ice. Cirques and arêtes dissect the terrain at higher altitudes.

Unconsolidated deposits south of the lake include till, ice-contact stratified drift, outwash, and both stream and lake sediments; bedrock also is present close to the surface in places.

Biological Features of Special Interest. The plant assemblages around Walker Lake illustrate a wide range of environmental controls that emphasize the harshness of the subarctic climate. Treeline stands at an average altitude of 2,000 feet east and west of the lake with striking examples of the detrimental effects of wind and beneficial influence of snow cover occurring at many readily accessible sites along the forest margin. Pronounced contrasts in soils and plant cover related to differences in topography, internal drainage, and composition of the bedrock and sediments are illustrated. Walker Lake provides a definitive view of these ecological variables and their relationships at the edge of the boreal forest margin under subarctic conditions.

The richness of the flora at Walker Lake reflects the great diversity of habitats available in a concentrated area. Relative to other areas of Interior Alaska, Walker Lake has a more mesophytic vegetation, which clearly has closer affinities with the Bering Sea and Pacific coastal regions to the west and south than with the interior regions to the east. Large portions of the mountain slopes

around Walker Lake are covered with dense alder (Alnus sp.) stands reminiscent of mountain slopes along the Alaskan Pacific coast. Walker Lake's relatively diverse fern flora is also atypical for Interior Alaska. Floristically, this mesic condition is suggested by the presence of coastal species such as Asplenium viride, Heracleum lanatum, and Potentilla villosa.

Animal life at Walker Lake well-represents that of northern Alaska. Moose (Alces alces), caribou (Rangifer tarandus), black and grizzly bear (Ursus americanus and U. arctos) and Dall sheep (Ovis dalli) all occur in the Walker Lake area, at least seasonally, and smaller animals found commonly throughout Interior Alaska are well-represented. The avifauna of the area is moderately large and varied. Many birds that are found in the spruce forests of Interior Alaska are found in reduced populations at Walker Lake. This is particularly true of species like the Olive-sided Flycatcher (Nuttallornis borealis), Violet-green Swallow (Tachycineta thalassina), Yellow-shafted Flicker (Colaptes auratus), and Bohemian Waxwing (Bombycilla garrula). All of these species are existing at the actual limit of their northern distribution; because of this they provide unusually interesting opportunities to study populations in their marginal relationships. The lake is large enough to attract during migration some of the shore birds and gulls that are normally restricted to coastal regions. A small population of Harlequin Ducks (Histrionicus histrionicus) is resident in the outlet, and we found a good population of Arctic Warblers (Phylloscopus borealis) on the slopes of the mountains at the north end of the lake. Walker Lake has a sizeable population of lake trout (Salvelinus namaycush) and arctic grayling (Thymallus arcticus) which provide excellent sport fishing. Pike (Esox lucius), salmon, whitefish, and sheefish (Stenodus leucichthys) also may occur in the lake.

ELIGIBILITY FOR LANDMARK STATUS:

Walker Lake provides an outstanding example of historical glacial activity and the resulting ecological associations that illustrate a wide range of habitats at the northern margin of tree growth under subarctic conditions. Impressive scenery complements the geological and biological values of the Walker Lake area.



Fig. 1. Copy of portion of the Survey Pass, Alaska quadrangle

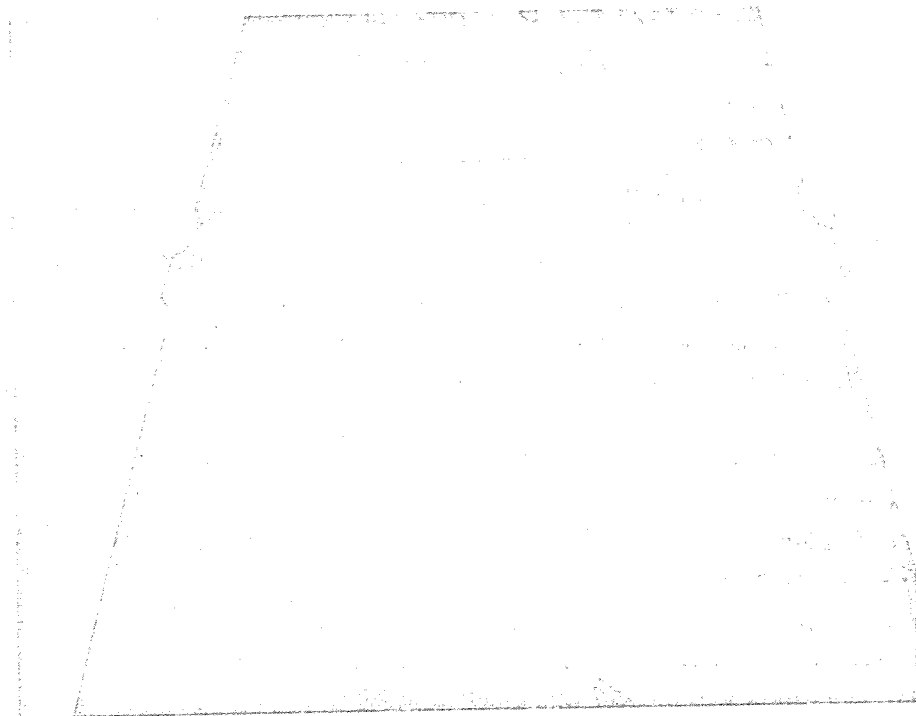


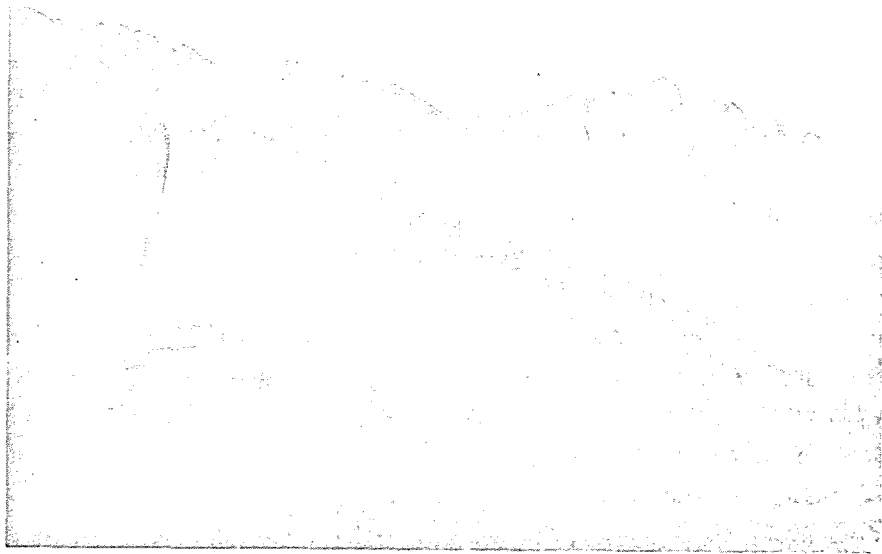
Fig. 2. Aerial view of the lower part of Kaluluktok Creek and the north end of Walker Lake. Note the steepness of the surrounding terrain and the narrowness of the valley bottoms. The difference in elevation between the lake and the adjacent peaks is over 3,000 feet. North is at the top of the photograph, and the scale is just under 4 miles to the inch.



Fig. 4. Looking southeast down Walker Lake from a point just above Camp IV. Note the open nature of the spruce, the low shrub understory, and the dense ground cover of fruticose lichens.



4
Fig. 8. The shore of Walker Lake showing the driftwood-cluttered beach, tall shrub, and open spruce forest.



5
Fig. 5. Ridges west of the north end of Walker Lake. The principal rock is schist, but large limestone outcrop is visible in the middle-ground. The peak in the background is about 3,500 feet high. The open spruce grades into shrub zones with increasing elevation.

LIST OF REFERENCES

- Cantwell, J. C. 1887. A narrative account of the exploration of the Kowak River, Alaska. (1885). Pp. 21-52. In: Healy (1887).
- Dean, F. C. 1964. Biological investigations of the Baird and Schwatka Mountains, Brooks Range, Alaska, 1963. Report to the Conservation Foundation, N.Y.C. vii + 113 p. mimeo.
- Fernald, A. T. 1964. Surficial geology of the central Kobuk River Valley, northwestern Alaska: U. S. Geological Survey Bull. 1181-K, 31 p.
- Giddings, J. L., Jr. 1956. Forest Eskimos. An ethnographic sketch of Kobuk River people in the 1880's. Univ. Museum, Philadelphia, Pennsylvania. 61 p.
- Hamilton, T. D. 1966. Geomorphology and glacial history of the Alatna Valley, northern Alaska: Unpub. Ph.D. Dissertation, Univ. Washington, 264 p.
- Healy, M. A. 1887. Report of the cruise of the Revenue Marine Steamer Corwin in the Arctic Ocean in the year 1885. U. S. Treasury Dept., Washington, D. C. (1885). 102 p. with two foldout maps.
- _____. 1889. Report of the cruise of the Revenue Marine Steamer Corwin in the Arctic Ocean in the year 1884. U. S. Treasury Dept., Washington, D. C. (1884). 128 p.
- Irving, L. 1960. Birds of Anaktuvuk Pass, Kobuk, and Old Crow. A study in arctic adaptation. U. S. Natl. Museum Bull. 217. viii + 409 p.
- McLenegan, S. B. 1889. Exploration of the Kowak River, Alaska. Ornithological notes. (1889). Pp. 109-125. In: Healy (1889).
- Mendenhall, W. C. 1902. Reconnaissance from Fort Hamlin to Kotzebue Sound, Alaska, by way of the Dall, Kanuti, Allen, and Kowak rivers: U. S. Geological Survey Professional Paper 10, 68 p.
- Smith, P. S. 1913. The Noatak-Kobuk region, Alaska: U. S. Geological Survey Bull. 536, 160 p.
- _____, and J. B. Mertie, Jr. 1930. Geology and mineral resources of northwestern Alaska. U. S. Dept. Int., Geol. Surv., Washington, D. C. Bull. 815. viii + 351 p. and two insert maps.
- Townsend, C. H. 1887. Notes on the natural history and ethnology of northern Alaska. (1885). Pp. 81-96. In: Healy (1887).

REPORT ADF & G

BROOKS RANGE LAKES STUDY

In late July and early August 1967 a cooperative survey of 10 lakes on the south slope of the Brooks Range was undertaken by the Bureau of Land Management and the Sport Fish Division of Alaska Department of Fish and Game.

Participation of the Sport Fish Division in this survey was aimed toward gaining a better knowledge of the sport fishing potential and fish species composition of these waters in conjunction with a BLM Land Classification Study.

Initial plans for the survey included use of a BLM Grumman Goose aircraft to fly the men and equipment from lake to lake as each was surveyed. However, forest fire duty of this aircraft at the time of the survey cancelled out our use of it. It was decided to use a Department of Fish and Game Cessna 180 float plane in place of the Grumman Goose rather than postpone the survey for another year.

Although the Cessna 180 was less than ideal for our purposes because of limited carrying capacity, we were able to accomplish most of our objectives by shuttling men and equipment on several flights.

Instead of moving camp from lake to lake it was decided that we would headquarters at Walker Lake and use the float plane to set nets in several lakes in succession, returning the

next day to lift the nets. The obvious disadvantage of this method is that it left little time for testing the quality of angling and for depth soundings and other measurements.

A brief aerial reconnaissance was made of each lake and a likely looking location for setting a gill net was chosen. Only one gill net (125'x6' of monofilament construction with 5 mesh sizes graduated from 1/2 inch to 2-1/2 inches square measure) was set in each lake. Thus the fish captured do not necessarily represent the total number of fish species in a lake or perhaps even give a representative sample of fish size and availability. A much more detailed survey of these lakes is needed if the Department is to make management recommendations for these waters, and it is hoped that such surveys can be undertaken in the near future.

Attempts were made to obtain a few random depth soundings of each lake using a Ross P-100 fathometer. This machine is graduated only to 100 feet but will give multiples of this if depths are recorded frequently enough to follow the 100' increments on the dial. It was not practical to do this using only the float plane and on only two lakes, Walker and Wild, were we able to use a boat or canoe for depth sounding on limited areas of the lakes. Thus depths recorded are not necessarily maximum, and it is believed that lakes such as Walker may be several times deeper than our records indicate.

Data from the fish collected during this survey is presented in Table I. Because of slow growth and the extreme age of many of the fish, attempts at aging them by scale reading was accomplished with some difficulty, especially with northern pike, and ages listed in Table II should be considered as only approximately correct. Other data for the individual lakes is included in the following narrative:

WALKER LAKE: 154° 25' W Long - 67° 10' N Latitude. Surface area 9,500 acres, approximate depth 105'±. This lake is one of the most accessible good lake trout and arctic char lakes in the Brooks Range as it is located approximately 45 minutes by float plane west of Bettles. Walker Lake is the largest lake in the area and is also probably the finest, not only from a fishery viewpoint but also aesthetically. It's natural beauty is marred only by the presence of several buildings on Swan Island and one on the northwest shore of the lake.

TABLE I

Results of Test Netting 1967, South Slope of Brooks Range

Name	Date	Number	Species	Length Range mm.	Mean Length mm.	Wt. Range Grams	Freq.*	% Comp.
Walker Lake	7-30-67	15	LT	165 - 838	523	397 - 8853	0.36	35.72
		2	Gr	117 - 356	236		0.05	4.76
		2	Char	559 - 622	591	1674 - 2724	0.05	4.76
		23	RWF	140 - 394	328		0.54	54.76
Minakokosa Lake	7-31-67	3	LT	508 - 660	588	1191 - 2894	.07	37.50
		5	RWF	305 - 432	376		.12	62.50
Wild Lake	8-2-67	4	LT	419 - 686	519	680 - 3632	.16	36.36
		2	NP	572 - 615	594	1021 - 1419	.08	18.18
		1	Ci	234	234		.04	9.09
		4	RWF	259 - 394	316		.16	36.36
Kollioksak Lake	7-29-67	3	Ci	262 - 375	327		.12	33.33
		6	NP	398 - 720	514		.25	66.66
Iniakuk Lake	7-29-67	1	LT	575		1986	.02	7.69
		4	NP	521 - 765	604	964 - 1532	.08	30.77
		4	RWF	234 - 330	270		.08	30.77
		4	HWF	452 - 588	490	1219 - 2724	.08	30.77
Helpmejack Lake	7-28-67	2	LT	610 - 648	629	2156 - 2781	.08	14.28
		1	Gr	140	140		.04	7.14
		10	NP	356 - 699	517	340 - 2894	.42	71.42
		1	RWF	284	284		.04	7.14

TABLE I Continued

Name	Date	Number	Species	Length Range mm.	Mean Length mm.	Wt. Range Grams	Freq.*	% Comp.
Nutuvukti Lake	7-31-67	3	NP	597 - 787	673	1247 - 3859	.07	33.33
		6	HWF	470 - 546	503	1247 - 2156	.14	66.66
Takahula Lake	7-29-67	1	Gr	280	280		.04	33.33
		2	NP	715 - 787	751	2724 - 3235	.08	66.66
Tobuk Lake	7-31-67	14	NP	495 - 800	621	709 - 4142	.33	100.00
Selby-Narvak Lake	7-29-67	3	LT	530 - 686	585	1362 - 2951	.13	10.34
		19	Gr	148 - 415	342		.79	65.51
		7	NP	399 - 978	725	482 - 7604	.29	24.13

*Number of fish per hour in 125' variable mesh gill net.

LT	-	Lake Trout (<u>Salvelinus namaycush</u>)	NP	-	Northern Pike (<u>Esox lucius</u>)
Gr	-	Grayling (<u>Thymallus arcticus</u>)	Ci	-	Least Cisco (<u>Coregonus sardinella</u>)
RWF	-	Round Whitefish (<u>Coregonus cylindraceum</u>)	HWF	-	Humpback Whitefish (<u>Coregonus lavaretus</u>)
Char	-	Arctic Char (<u>Salvelinus alpinus</u>)			

TABLE II

Size and Age of Game Fish from various Brooks Range Lakes 1967.

Lake	Species	Length mm	Weight Grams	Age
<u>Walker</u>	Lt	838	8,853	13+
	Lt	762	6,356	10+
	Lt	660	3,092	11+ or 12+
	Lt	640	3,234	6+ or 7+
	Lt	533	1,475	9+
	Lt	526	1,674	8+
	Lt	526	1,731	8+
	Lt	513	1,390	8+ or 9+
	Lt	495	1,390	8+
	Lt	495	1,077	7+
	Lt	483	964	8+
	Lt	394	567	5+
	Lt	358	397	5+
	Char	622	2,724	9+
	Char	559	1,674	8+
<u>Minakakosa</u>	Gr	356	--	5+
	Gr	117	--	1+
	Lt	660	2,894	10+
	Lt	597	1,929	7+
<u>Wild</u>	Lt	686	3,632	10+
	Lt	523	1,702	9+
	Lt	437	794	6+
	Lt	419	680	6+
	Np	615	1,419	15+
	Np	572	1,020	13+
	Np	720	2,809	16+
	Np	614	1,645	12+
<u>Kolliaksak</u>	Np	426	454	9+
	Np	410	454	8+
	Np	398	454	11+ or 12+

(Table II Continued)

Lake	Species	Length mm	Weight Grams	Age
<u>Iniakuk</u>	Lt	575	1,986	7+
	Np	765	--	19+
	Np	610	1,532	12+
	Np	521	992	8+
<u>Helpmejack</u>	Lt	648	2,781	9+
	Lt	610	2,156	9+
	Np	699	2,894	15+
	Np	624	2,837	14+
	Np	546	1,362	10+
	Np	521	--	10+
	Np	500	822	7+
	Np	495	1,077	9+
	Np	495	1,021	11+
	Np	475	--	9+
	Np	406	454	6+
	Np	356	340	6+
	Gr	140	--	1+
<u>Nutuvukti</u>	Np	787	3,859	19+
	Np	635	--	16+
	Np	597	1,247	8+
<u>Takahula</u>	Np	787	3,235	17+
	Np	715	2,724	16+
	Gr	280	--	4+
<u>Tobuk</u>	Np	800	4,143	18+
	Np	724	1,202	16+
	Np	711	1,986	16+
	Np	711	1,873	14+
	Np	686	2,156	13+
	Np	622	1,759	12+
	Np	610	1,589	12+
	Np	584	1,077	9+

(Table II Continued)

Lake	Species	Length mm	Weight Grams	Age
Continued				
<u>Tobuk</u>	Np	572	1,191	11+
	Np	551	964	10+
	Np	546	907	10+
	Np	546	1,077	10+
	Np	533	857	12+
	Np	495	709	10+
<u>Selby - Narvak</u>	Lt	686	2,951	9+
	Lt	540	1,617	7+
	Lt	530	1,362	7+
	Np	978	7,604	23+
	Np	775	3,036	16+
	Np	760	3,462	16+
	Np	686	2,497	12+
	Np	508	1,134	10+
	Np	399	482	6+
	Gr	415	737	8+
	Gr	405	680	8+
	Gr	400	--	7+
	Gr	380	--	6+
	Gr	148	--	1+

Walker Lake was netted for a total of 42 hours. The largest lake trout, 8,853 grams (19-1/2 pounds), and the only arctic char taken in this survey were captured off Swan Island. The lake had previously been recorded as containing northern pike but none were taken on this survey. Had other sites been selected for netting perhaps northern pike and possibly more grayling may have been captured. Angling from the shore of Swan Island was not very rewarding as only a few arctic char and lake trout were taken in several hours of fishing.

Lake trout stomachs contained a variety of items ranging from snails and insects to slimy sculpin (Cottus cognatus) and other fish, including a 2 pound lake trout in the stomach of the largest lake trout.

The smallest mature lake trout were a 483 mm. female and a 495 mm. male.

Light to moderate infestations of tapeworms and tapeworms cysts were found in the viscera of the lake trout and char.

Depth readings were taken only between Swan Island and the west shore and the 105 foot depth recorded is probably only a third or less of the maximum depth of this lake.

MINAKOKOSA LAKE: 155° 00' W Long - 60° 50' N Latitude. Surface area 600 acres approximately.

This comparatively small but highly scenic lake was netted for 43 hours with a catch of only 3 lake trout and 5 humpback whitefish. All of the fish captured had tapeworms cysts on their stomachs.

The whitefish had been eating snails and clams and only one lake trout stomach contained unidentified fish remains.

Limited depth sounding revealed a depth of 135 feet.

WILD LAKE: 151° 32' W Long - 67° 30' N Latitude. Surface area 2,000 acres approximately.

Wild lake is an approximate 45 minute float plane flight north of Bettles and like Walker and Selby-Narvak Lakes is elongated on a generally north - south axis. The lake is quite scenic but also is more developed with homesites and cabins than any other lake of the survey. A single net set on the southwest side of the lake produced northern pike, lake trout, round whitefish and cisco. Additional northern pike and lake trout were taken by angling, both from shore and by trolling.

The angling for pike and lake trout can be considered very good and residents of the lake report grayling fishing to be excellent at the inlet and outlet, although this was not tried.

Extensive depth soundings in the northern one-third of the lake showed depths to 237 feet and it is likely that greater

depths can be found in the southern or middle portions of the lake, judging by the surrounding topography. Fish parasites included tapeworm cysts on the viscera of lake trout and round whitefish, tapeworms and roundworms in the northern pike and copepods on the gills of whitefish.

The presence of burbot was disclosed in the stomach contents of one of the pike and one lake trout stomach contained many small shiner-like fish, probably young cisco.

KOLLIOKSAK LAKE: 156° 28' W Long - 66° 58' N Latitude. Surface area 500 acres approximately.

This is the most westward lake surveyed this season, and with a recorded depth of only 30 feet is one of the shallowest of the lakes studied. Only 6 pike and 3 cisco were taken in the net which was fished for 24 hours. The lake is probably too shallow for lake trout. Stomach contents of the pike were unidentified fish remains. No parasites were noted in the pike, but tapeworm cysts were found in one cisco.

The lake is not particularly outstanding from a scenic standpoint but does have a fair northern pike fishery.

INIAKUK LAKE: 153° 12' W Long - 67° 08' N Latitude. Surface area 3,200 acres approximately.

A single net set in this lake yielded only three northern pike and 2 whitefish in 24 hours. Because of this small sample the net was reset in another location and this time captured 1 lake trout, 1 northern pike, 2 round whitefish and 4 humpback whitefish in 24 hours.

Slight infestations of tapeworms were noted in all species but northern pike. Northern pike stomachs contained sculpin and burbot, (Lota lota), the lake trout contained sculpin and ninespine stickleback (Pungitius pungitius) and both the round and humpback whitefish had snails in the stomach contents.

A few random soundings in the lake revealed a depth of 102 feet but somewhat deeper areas may occur.

HELPMEJACK LAKE: 153° 34' W Long - 66° 56' N Latitude. Surface 600 acres approximately.

This lake is approximately 35 minutes from Bettles by float plane. One net was set near the inlet in water from 0 to 12 feet and was fished for twenty hours.

Both lake trout captured were quite thin bodied and were heavily parasitized with tapeworms. The ten northern pike also had tapeworm infestations, but not to the degree of the lake trout. Stomach contents of the pike included sculpin, amphipods and unidentifiable fish remains. Both lake trout stomachs were devoid of food.

A series of soundings across the lake revealed a depth of 83 feet. The low terrain surrounding the lake would also indicate that the lake probably was not very deep. Previous surveys indicated very good fishing for lake trout but this could not be borne out by our limited test netting.

NUTUVUKTI LAKE: 154° 45' W Long - 67° 00' N Latitude. Surface area 3,600 acres approximately.

This large, shallow lake with a recorded depth of 57 feet was fished for 44 hours with one net, capturing only 3 pike and 6 humpback whitefish. Lake trout are probably not present in the lake, at least in any numbers, but the lake requires a much more detailed study in the future.

Stomach contents of the pike did not disclose any other species in the lake and the only parasites noted were tapeworm cysts in the whitefish.

TAKAHULA LAKE: 153° 40' W Long - 67° 22' N Latitude. Surface area 350 acres approximately.

This is one of the smallest lakes surveyed but also one of the most scenic. It lies along the Alatna River with sheer cliffs bordering the northwest side. A single net set on the west side

of the lake produced only 2 northern pike and one grayling in 24 hours, although the lake is reported to contain lake trout. Sounding across the lake showed a depth of 65 feet.

TOBUK LAKE: 153° 28' W Long - 67° 18' N Latitude. Surface area 380 acres approximately.

This is a rather small lake located south and east of Takahula Lake.

A net set off the northeast point for 42 hours captured only 14 northern pike, most of them rather small. Several of the pike were infested with tapeworms, one had sculpin in the stomach, one contained pike remains and a third pike contained unidentified fish remains. All remaining pike had empty stomachs.

Depth soundings were not taken because of windy conditions but the net set was very shallow and it is believed the lake is also quite shallow.

SELBY-NARVAK: 155° 40' W Long - 66° 55' N Latitude. Surface area 4,700 acres approximately.

This water is actually two lakes separated by a narrow channel. A single net set overnite in the narrows produced 7 pike, 3 lake trout and 19 grayling. While we were lifting the net the aircraft pilot tried angling for grayling. He caught and released 15 grayling from 10 - 14 inches in 15 successive casts.

All three species of fish captured had either tapeworms or tapeworm cysts and one lake trout had copepods on the tongue. Although no round whitefish were captured in the net their presence in the lake was confirmed in the stomach contents of one of the pike. Other pike stomachs contained grayling and sculpin, while the lake trout contained unidentified fish remains and the stomach contents of the grayling were also beyond recognition.

A depth of 150 feet was recorded in the northern part (Narvak) of the lake but the lake could easily be much deeper in spots. Of the lakes studied this lake is second only to Walker Lake in both size and beauty and has perhaps an even better fish population, although as stated previously our limited sampling of these lakes does not permit us to make conclusive statements about the quality of the fishery.

DISCUSSION:

It is apparent from the foregoing that studies undertaken this past season were quite cursory; this due both to equipment limitations and to the short period available for the survey. These waters will continue to become more important to the sport fisherman as our population both of resident and tourist fishermen grows; thus they deserve a study in detail as soon as practicable.

Continuation and expansion of the present studies should include the use of an aircraft capable of moving the men and equipment quickly from lake to lake. A portable boat or canoe equipped with an outboard motor is also essential to adequately sound lakes, investigate bottom types and spawning grounds, and test angling quality.

It will be noted from Table II that the northern pike are very slow growing in these lakes. Their linear growth lags about ten percent behind that of pike in the Minto Flats, near Fairbanks.

These pike are also in somewhat poorer condition than Minto pike.

This would be expected because of the colder more infertile water of northern lakes with their shorter open water season.

It is difficult to make many conclusive statements about the lake trout from the limited sample taken but in general their

linear growth compares favorably to that of lake trout in Paxon and Summit lakes in the Alaska Range. However, the condition of the Paxon and Summit lakes lake trout is considerably better. Many of the Brooks Range lake trout tended toward the large head-slim body associated with poor growing conditions.

The few grayling taken in this survey compare favorably and possibly surpass the growth rates of grayling from the Chena River, near Fairbanks.

Catch per net hour was very low in many of the lakes, possibly due in part to our lack of familiarity with the lakes, resulting in failure to locate the best places for net sets. However, the low catch may also be a reflection of rather sparse fish populations.

The large percentage of both pike and lake trout captured with empty stomachs is also indicative of shortages of prey species and young game fish.

ALASKA DEPARTMENT OF FISH & GAME


Eugene A. Roguski
Fishery Biologist



STATE SELECTION

NAVAL PETROLEUM RESERVE
No. 4

POTENTIAL STATE SELECTION

ARCTIC
CORRIDOR
607 Class.

ARCTIC WILDLIFE RANGE

BORNITE-607 CLASS.

VENETIE NATIVE
RESERVATION

RAMPART WITHDRAWAL
PLO 2214